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MAR. 30

1953

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Budget cuts are in the making. Don't underestimate their extent. Nature of many cuts won't be evident until late May or June.

On the military side. Defense Secretary Wilson says his department's appropriations request for fiscal 1954 will be less than the $41.3 billion asked by Truman. He thinks cuts can be made without reducing combat strength. Deputy Secretary Kyes has hinted at reductions, cutbacks, and stretch-outs, to be made "carefully" and "intelligently."

Pentagon is considering stretch-out of scheduled deliveries of eight-jet Boeing B-52 intercontinental bomber. Study by Rand Corp. for USAF, questioning need for large numbers of B-52's, may also be involved in this.

Except for second sources of supply, no basic plane or engine program is likely to experience serious cutback. Much of the cutting is in rescinding authorizations not yet committed. Some air defense phases may even be stepped up.

Navy didn't wait to be told. It initiated its own reduction, will be in good shape to appear before Congress.

Air Force started defending all plans and commitments. Consequently, cuts will be more hasty and arbitrary. They may total $2 billion.

On the civil side, Commerce Secretary Weeks has led the way. He's knocked 15% off his budget. This affects all Commerce agencies, including CAA. He may make another cut later on.

Federal Airport Program has been all but wiped out for fiscal 1954. Reports are that CAA's Office of Airports will have only $1 million to $2 million. This would be carried over from present fiscal year, to be used for administrative purposes (in 1952, administrative costs amounted to 14.4% of funds appropriated).

•

CAB's refusal to underwrite Pioneer Air Lines' operation of Martin 202's with increased mail pay is seen as inidcation that Board realizes economy-minded Congress will scrutinize subsidies.

From an equipment point of view, CAB's action in Pioneer case may be the best thing that has happened to local service lines.

Decision will make them wary of switching from DC-3's to other existing planes. It encourages concentration of effort on a new DC-3 replacement.

Manufacturers also have an incentive. CAB emphasized support of legislation for development of local service prototype, and indicated clearly that it will support such a plane through mail pay.

•

Trans-Atlantic fare structure is threatened by Loftleidir, Icelandic airline. A non-IATA carrier, it's undercutting U.S-Scandinavia IATA rate on flights via Iceland. IATA lines are concerned, will protest to U.S.

On domestic fare front, air lines still take serious view of CAB's proposed general fare investigation. Most of them have asked to have it called off. Fare cut at this time, with costs still rising, would be disastrous, particularly in connection with re-equipment programs.

At least one CAB member agrees, thinks investigation would prove nothing.

The Washington View

Cutbacks on Capital Hill

For the first time since it convened almost three months ago, Congress last week took a broad swing at aviation matters. Under fire were:

THE U. S. AIR FORCE—RESEARCH AND DEVELOPMENT

Having ignored Congress's edict to change its manner and method of operation of the Arnold Engineering Development Center at Tullahoma, Tenn., the USAF now wants emergency action to permit the continued use of appropriations for making payments to ARO, Inc., its operating contractor, after March 31. House Armed Services Committee Chairman Dewey Short (R. Mo.), in taking up the Air Force request, first introduced a measure (H.R. 4130) to repeal the appropriations rider banning further Air Force payments to ARO, then promptly called for a committee hearing on the bill.

Some of the touchy points raised by the whole USAF/ARO relationship which will undoubtedly be re-examined during the committee hearings:

- **What drives Senator Gore** to press his attacks against the Air Force's operation of a major facility in his home state, an almost unheard of action?
- **Why did the Air Force** ignore the specific recommendations of the AEDC site-selection advisory group, chairmanned by Dr. John Markham of M.I.T., an action which cost the taxpayers millions of dollars in added equipment costs overcoming technical regional limitations?
- **Why did the Air Force** resort to employing ARO, rather than handling research work on its own or contracting with NACA or the Navy for this project?
- **What has ARO accomplished** as management operator of AEDC during the past three years, and at what profit on its limited investment?
- **Why does the Air Force** continue to justify the ARO operation in spite of Congressional dissatisfaction over the project, and what did Air Force Secretary Harold Talbott learn as a result of his recent and hurried trip to Tullahoma that would justify this continued support?
- **What was Sen. Stuart Symington's** role in the original decision to award a contract to ARO, and will he stand by and permit his colleagues in the Senate to criticize his earlier action without joining the fight?

THE U. S. AIR FORCE—PROCUREMENT

Why Kaiser-Frazer Corp. was brought into the production picture for the C-119 troop carrying transport by the Air Force instead of letting Fairchild Aircraft Div., which developed the plane, build all that was needed, is a question which still has not been answered to the satisfaction of Congress.

A searching inquiry into the Air Force contracts awarded K-F has been undertaken by a Senate Armed Services Committee subcommittee, headed by Sen. Styles Bridges (R., N. H.). Point of the probe, according to Chairman Bridges, is to determine why K-F's cost per plane runs $1,200,000, compared with a Fairchild cost of $260,000 per unit for the same type plane.

THE CIVIL AERONAUTICS BOARD

Outlook for an improvement in the relations between CAB and Congress have not brightened. The signs are that the smoldering antipathy on Capital Hill toward the Board is spreading.

The first blast of censure this year came in a broadside aimed by the Senate Small Business Committee. Singled out in the Committee's annual report, the CAB was cited as an example of government animus toward small companies: "An emphatic reaction to the problems and philosophies of the dominant element of the industry under its jurisdiction."

The Senate group, champion of the nonscheduled airline, charged the Board with methods of inducing "debt by delay" and "strangulation by regulation." This week the Board's thinking and its attitudes will be reappraised with the opening of public hearings by the senate subcommittee on Relations of Business With Government. In the lower chamber, CAB has also come off second best. A poor showing in presenting its policy position at a House Commerce Committee hearing left the Board rocking. Veteran CAB member Oswald Ryan, making his first appearance as Board chairman stumbled badly. Testimony of top CAB staff members served only to widen further the breach created by Ryan.

Committee antagonism was apparent as direct answers were circumvented by long winded explanations. In disgust, one congressman later said, "regularly we have these people up here and you can never get a straight answer from them."

Another drag on the board has been the delay in filling the vacant fifth membership. Nomination of Harmar D. Denny to the post, along with that of Fred Lee to be Administrator of Civil Aeronautics, has been gathering dust in a Senate Commerce Committee pigeonhole for nearly three weeks. Why rush to clear them, when the White House took its time in sending the names up, has been the attitude of the committee.

. . . Preble Staver

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OTHER PUBLICATIONS . . .

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American Aviation Directory; twice yearly listing of products, people and organizations. $7.50 each. Managing Editor: Marion E. Grambow.

Official Airline Guide: Monthly publication of airline schedules and fares. $11 per year in USA and countries belonging to Pan American Postal Union, including Spain and the Philippines. $12.50 elsewhere. Published from 139 N. Clark St., Chicago 2, Ill. Central 6-5804. Managing Editor: Robert Parrish.

American Aviation Traffic News (incorporating Air Tariff Reporter): Daily rates and tariff news. $150 per year. Managing Editor: Wallace I. Longstreth.

When & Where

Mar. 31-Apr. 2—1st International Magnesium Exposition, National Guard Armory, Washington, D. C.

Apr. 16-17—Radio Technical Commission for Aeronautics, Spring Meeting, Wardman Park Hotel, Washington, D. C.

Apr. 18-19—Air Force Association, California Wing Convention, Hotel Manor, San Diego, Calif.

Apr. 20-22—Northwest Airport Management Conference, Eugene, Ore.

Apr. 20-24—SAE, Aeronautic & Aircraft Engineering Display, & Aircraft Production Forum, Hotel Governor Clinton, New York.

Apr. 28-30—Air Traffic Conference, Edgewater Beach Hotel, Chicago.

Apr. 29-May 1—AIEE-IRE Electronics Components Symposium, Shakespeare Club, Pasadena, Calif.

May 6-7—Women's National Aeronautical Association, 2nd Annual Skylady Derby, Fort Smith, Ark.-Memphis, Tenn.-St. Louis, Mo.-Fort Smith.

May 8-10—Oklahoma City Air Fair, Will Rogers Field, Oklahoma City.

May 10-17—Virginia Aviation Jubilee. Air Exhibition, Byrd Field, Richmond, Va., May 16 and 17.

May 11-13—IRE National Conference on Airborne Electronics, Dayton Biltmore Hotel, Dayton, Ohio

May 14-15—Sixth Annual Wisconsin Aeronautics Conference, Hotel Wisconsin, Milwaukee.

May 14-17—9th Annual Forum, American Helicopter Society, Mayflower Hotel, Washington, D. C.

May 17—National Air Carnival (Armed Forces Day), Municipal Airport, Birmingham, Ala.

May 18-22—5th National Materials Handling Exposition, Convention Hall, Philadelphia, Pa.

May 19-22—ATA Operations Conference, Park Plaza Hotel, St. Louis, Mo.

May 19-23—Aviation Writers Association, Annual Convention, Dallas, Texas.

June 6—4th Annual Maintenance & Operations Clinic, Reading Aviation Service, Inc. Municipal Airport, Reading, Pa.

June 7-12—SAE, Summer Meeting, Ambassador & Ritz-Carlton Hotels, Atlantic City, N. J.

International

Apr. 20—IATA, 6th Technical Conference, Puerto Rico.

May 14-22—FAI Conference, Scheveningen, Holland.

June 16—ICAO Assembly, Brighton, England.

June 26-July 5—Int'l Aircraft Engineering Convention, Paris; and Int'l Aircraft Show, Le Bourget Airport, Paris, sponsored by French Aircraft Industries Association.

Aug. 25—ICAO, Legal Committee, Rio de Janeiro.

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Editorial

Industry Needs to Watch

THREE current developments will require the closest scrutiny by industry within the next three months:

• **No one should underestimate** the extent of budget cutting for the new fiscal year starting July 1 now going on within every Government department including Defense. Billions are to be trimmed off the Truman-prepared program. But the major effort is to put government spending on more of a cash basis. The heart of the basic air power program is to remain intact, but second sources of supply and many fringe programs may be sharply slashed. The trend toward cutting which began in February has not changed.

by W. W. P.

• **Concurrent with the drive** for economy may well come a spurred effort toward air defense build-up, including more latest-type airplanes, which will be more concentrated than the vast sprawling and costly all-out defense effort which began two years ago. Reason: Russia's recent atomic progress, which has high-level planners worried.

• **Watch former Secretary of the Air Force** Stuart Symington, now U. S. Senator from Missouri. He is vital key to Pentagon reorganization and revelations of past bungling which must come out in time. Note excerpts from his recent hard-hitting speech elsewhere in this issue.

Tough — But Decisive

In one of its most forthright and determined decisions in its history, the CAB has told Pioneer Air Lines that it will not underwrite the increased mail pay needed to support the operation of Pioneer's fleet of Martin 2-0-2 equipment which was substituted for DC-3's last June. Of equal significance to the tough stand taken by the Board, the vote was unanimous.

The decision clarifies, once and for all, the position of local carrier airlines, both with regard to equipment and with regard to potential competition with the trunk carriers. The Board has made it clear that it *will* subsidize the development of a prototype aircraft to replace the DC-3 in local operations, but it will not subsidize trunkline types of aircraft, of which the Martin 2-0-2 is one. The importance of the decision is far-reaching in many directions.

While the decision is a rugged blow to Pioneer, it's in line with the economy moves of the times. It's going to be tougher to sell Congress and the new Administration on anything that costs more—now—regardless of whatever eventual hope of return on investment there may be. The need for more mail pay with the Martin equipment, at least now and for some time ahead, was apparent.

Local service airlines as a group are to be treated as a permanent fixture in domestic air transport, but this is to be a belt-tightening period with a goal of reducing federal expenditures and especially subsidies. Aviation must "take it" along with everything else. Those who had been accusing the CAB of wishy-washy, innocuous, and compromising decisions got their answer in this latest one. For good or bad the CAB got its back up decisively and unanimously.

Was It Really Worth It?

The ways of national consumer magazines are wondrous indeed. The other day we received a promotion letter from the advertising department of *The Saturday Evening Post* heralding a new ad series contracted for by an international airline. Attached to the letter was a copy of the March 7 issue of the *Post* and as we glanced at the cover our eyes fell on the title of the featured attraction of the issue, entitled "Air Disaster: A Survivor's Story."

This, we thought, is an odd way to promote the *Post* as an advertising medium, so we look further. Sure enough, the lead article of some thousands of words was about a Korean airlift DC-4, operated by a scheduled carrier, which crashed into the icy waters off Canada in January, 1952. For what it was intended to be, the article spared no details, gruesome or otherwise.

What intrigued us even more was what the writer had to say about causes. He referred to "the highly unusual occurrence of a double bookkeeping error" when TWA, which owned the airplane, sent an engine to Northwest, the operator. It was true, as the CAB said in its report, that the engine which conked out and was the initial cause of the accident had gone beyond its maximum overhaul time and that there had been a clerical error of omission, but TWA was needlessly dragged into the article. There was one error, not two. A reader couldn't help but get the impression that TWA was involved in the cause.

We don't say that *The Saturday Evening Post* shouldn't use its own editorial judgment about the kind of lead articles it runs, but the tie-up with an inaugural airline series was indeed strange. But apart from that, the sloppy reporting of the cause factors threw blame without reason where it shouldn't have gone. And, most strangely of all, the article was written by a staff writer of an aviation magazine. On and upward with the arts!

. . . WAYNE W. PARRISH

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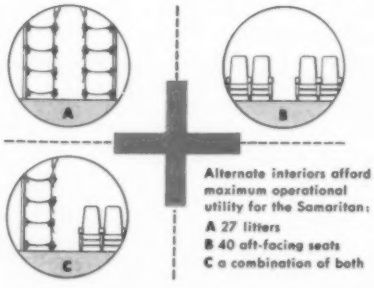

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Letters

Letters should be addressed to The Editor, American Aviation Magazine, 1025 Vermont Ave., N.W., Washington 5, D. C. Anonymous letters will not be printed, but names will be withheld upon request.

FLUNKIES?

To The Editor:

Your article in the March 2 issue of AMERICAN AVIATION, entitled "Terminal Audience Gets Ear Bent, Broken," impressed me. While reading the article the thought struck me that it would make good training material for our ramp agents and ticket agents, as they are the ones who are required to make public address announcements at our station.

Upon reading it further, I was somewhat shocked at the first sentence of the third column. Now, I realize that the article, although of a serious nature, was written in a humorous vein. The thing that disturbs me is that the sentence might imply that ramp agents are "flunkies." I'm sure that this was not the intent. Then, one must assume that there is such a thing as an "airline flunky."

I'm further concerned, in that being away up here in Albany, we might be behind this growing industry, and not be aware of a newly created job that some of the scheduled airlines are employing.

Please advise just what is a "flunky" and, if possible, send along a job description of an "airline flunky." We might be able to use such a person here.

W. P. SHANNON
Chief Station Agent
American Airlines, Inc.
Albany, New York

(Chief Agent Shannon's concern at the use of the term "airline flunky" is well taken. A glance at the dictionary reveals the word "flunky" to be especially inappropriate. Next time the dictionary will be consulted first. There are no flunkies in the airline business.—Ed.)

•

REQUIRED READING

To The Editor:

As a long suffering member of the bent ear fraternity, permit me to thank and commend you for the article on airport loudspeakers in the March 2 issue. Certainly every effort should be made to restrain the vocal aspirations of these eager but misguided Carusos who seize upon every opportunity to audition a voice which carries no charm for anyone except themselves. Your article should be required reading for every airport and airline manager on each Monday morning for the balance of this year.

KARL P. BLAISE
Vice President & Secretary
Inter-Ocean Reinsurance Company
Cedar Rapids, Iowa

•

MENACE

To The Editor:

Your article in AMERICAN AVIATION of March 2 about the abuse of the use of loudspeakers in terminal buildings cheered me enormously, as this is rapidly becoming a serious and quite unnecessary menace at airports all over the world.

Quite apart from intense personal irritation that I have suffered from time to time, I have often noticed that as a result of well-nigh continuous blaring of loudspeakers, passengers miss the one announcement that concerns them and if this is multiplied it results in chaos at busy airports.

It is very good to see you, with the respect you enjoy through the aviation world, giving vent to this growing menace, and I wish you every success in your campaign.

R. S. S. DICKINSON
Civil Air Attache
British Embassy
Washington, D. C.

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BOEING'S JET

To The Editor:

Your lead story on U. S. jets is both timely and provocative, and should assist in dispelling some of the misinformation which seems to be rampant on the subject. We did note one typographical error though, in connection with our announced flight schedule for the Boeing prototype. As you point out on page 13, we plan to fly in mid-1954. However, on page 14, you mention "Douglas is assuring the airlines it will have a flying article in 1957, approximately a year later than the announced Boeing schedule." Obviously 1957 is *three* years later than the Boeing schedule.

GORDON S. WILLIAMS
News Bureau Manager
Boeing Airplane Company
Box 3107
Seattle 14, Washington

•

To The Editor:

I have just finished reading the editorial comment contained in the Feb. 16 issue of AMERICAN AVIATION under the title, "The Jet Race Quickens." I am personally very pleased with your reporting—it is a clear, accurate, and fair appraisal of conditions as they are today, and constitutes a succinct summary of the Boeing position in this competition. We have had the feeling that our activity on Project "X" has not been appreciated or fully understood by aviation interests at large. I am confident that your article will do a great deal to clarify this situation.

WELLWOOD E. BEALL
Senior Vice President
Boeing Airplane Company
Box 3107
Seattle 14, Wash.

•

CLUTTERED RAMPS

To the Editor:

After reading the February 2 issue of AMERICAN AVIATION, I want to take issue with the comparative photographs which illustrate the article "Instead of Cluttered Ramps . . . Safety and Simplicity With Avomat."

The top photograph shows an American Airlines DC-6 being serviced on what I presume is a thru-flight. The airplane is not only being gassed (in three tanks simultaneously on the left wing) but in addition, passengers are deplaning, food servicing is about to take place, the number two engine is being serviced mechanically, and all other functions are taking place necessary to continuing a trip, all of which must be done in 25 minutes ground time.

The contrast can't help but be sharp, as the DC-6 in the lower picture shows only one tank being serviced by one man with none of the other activity present.

We know only too well and must admit that ground facilities have not maintained the pace in the same ratio that the airplane has progressed. We are, however, actively working on the subject, have made some improvements since this photo was made, and welcome new developments. My only "gripe" is that we should make pictorial comparisons on an equitable basis.

E. O. SCHROEDER
Assistant Vice President—Maintenance
American Airlines

(American's Vice President William Littlewood used the same picture in his Wright Brothers lecture to illustrate the complexity of present-day ramp operations. We followed suit.—Ed.)

Industry Spotlight

In the future a common set of instructions for preparing detailed aircraft specifications will be used by the Army, Navy, and Air Force. Order has been passed down from the Defense Department along with Military Specification MIL-I-6252, "Instructions for Preparation of Model Specifications for Aircraft," the mandatory document. The order should cut down present industry confusion resulting from too many divergent requirements.

•

Pratt & Whitney is reported putting the R-2180 engine back into production for use in a Navy helicopter. This is the deal which clinched Fokker's decision to put the Saab Scandia into production again. The Scandia is the only production airplane ever to be powered by the R-2180, the engine made up of half an R-4360. Only a small number of Scandias were built but VASP has recently ordered six more to bring its fleet to eleven aircraft. Other orders are in the mill.

•

A rocket engine of 50,000 pounds thrust, which could be adapted for assisted airplane take-offs, has been developed and built by North American Aviation for use in powering a test sled in operation at Edwards AFB. It is an oxygen-alcohol rocket and accelerates a 4,000-pound sled from dead stop to 1500 miles per hour in four to five seconds and 5500 feet travel. The engine will run about eight seconds on $100 worth of fuel. Solid propellant for same job would cost $5000.

•

First combat vehicle designed for helicopter transportability is the "Mitey Mite," a jeep-type unit developed by the Mid-America Research Corp. for the Marines and now at Quantico Naval Air Station, where it will be carried externally by a Sikorsky HRS-2 helicopter. The Mitey Mite weighs 1500 pounds, versus 2300 pounds for a regular jeep. In moving a division by air, resultant weight saving would save 150 plane trips, according to one branch of the services.

•

Northrop Aircraft will resume production on the F-89D, latest version of the Scorpion, in September, following completion of the wing modification to the 200 U. S. Air Force planes which were grounded late last year. First of the modified planes, incorporating heavier wing-attach angles, new tip tank pins, and other minor changes, has now been turned over to the USAF.

•

Republic's F-84F, sweptwing version of the F-84 Thunderjet, is scheduled to return to flight test operations soon following temporary grounding by the U. S. Air Force because of compressor blade troubles with the Wright J65 Sapphire engine. Engines were returned to Wright for slight modification, but the Thunderstreak engines have already been reshipped to Republic.

•

First of the Kaman HTK-1 helicopters to incorporate fuel tank modifications to correct the trouble which recently grounded all Navy and Marine Corps 'copters of this type has been returned to service. The Navy Bureau of Aeronautics grounded the Kamans in a service-wide order about six weeks ago when the fuel tank trouble developed.

•

Certification problems surrounding the Boeing KC-97 were the decisive factor in Northwest Airlines' choice of new four-engine equipment. NWA president Harold Harris wanted more Stratocruisers, converted Air Force KC-97's, but CAA certification requirements would have pushed the price from slightly over $1 million each to about $1.7 million, according to west coast reports. NWA will buy Lockheed Constellations, probably about six aircraft.

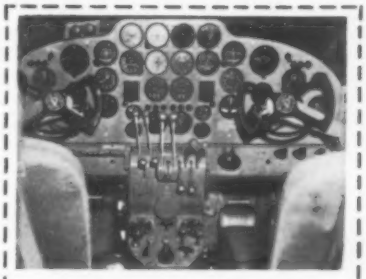
•

The first full-powered prototype of the Rolls-Royce Conway jet engine, designated the Mark 3, will be rated at better than 11,000 pounds thrust. Bench tests on the Mark 3 are scheduled to begin in June. So far there has been no U.S. interest in obtaining Conway license rights. U.S. manufacturers feel that current trends in development of regular jet engines will make them more powerful and more economical than by-pass engines by the time this type reaches maturity.

EXECUTIVE AIRCRAFT MODIFICATION

BY

TEMCO



CASE HISTORY: #822-109
CUSTOMER: ATLANTIC REFINING COMPANY
SHIP: BEECHCRAFT MODEL 18 N-80385

1,000 hour check and overhaul. Installed complete new interior, soundproofing cockpit. Designed and installed new instrument panel, overhauled all instruments; relocated radio equipment on TEMCO-fabricated racks, added Omni equipment and replaced all radio wiring. Installed new engines, overhauled all accessories. Painted exterior.

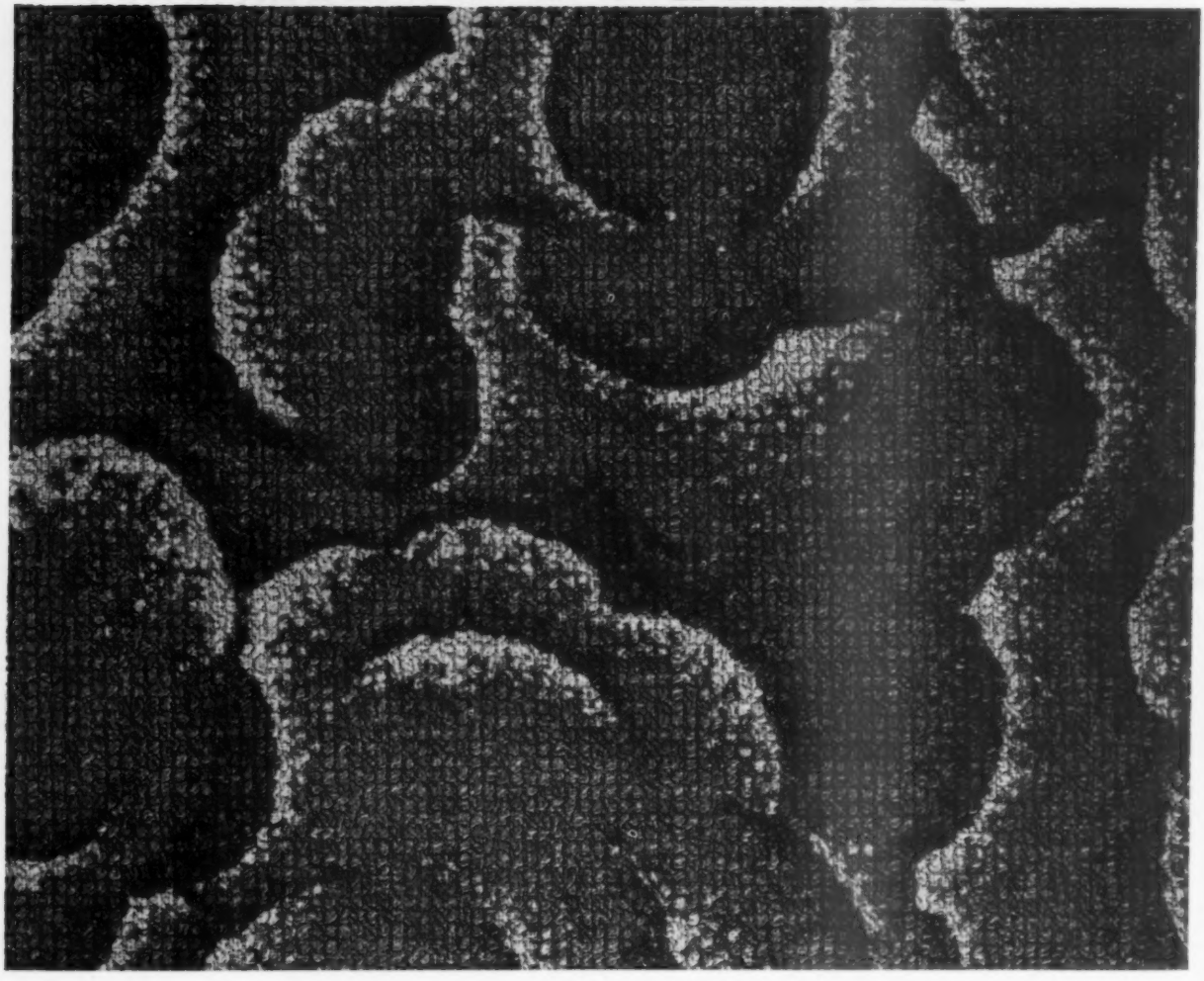
This is another typical executive aircraft rehabilitation job performed by TEMCO. From specialized modification to complete nose-to-tail overhaul, TEMCO has a reputation for doing the job *faster, better and at lower cost.* Formerly available only to the airlines and government agencies, this complete aircraft rehabilitation service is now offered to multi-engine executive aircraft operators.

For full details on this case history and information about TEMCO's complete custom rehabilitation service for multi-engine aircraft, write on business letterhead to:

Herrol Bellomy, Gen. Supt., TEMCO Aircraft Corporation, Greenville Overhaul Division, P. O. Box 1056, Greenville, Texas.

TEMCO AIRCRAFT CORPORATION
DALLAS, TEXAS

B.F.Goodrich



Looks like a carpet, cleans like a dish

KEEPING a commercial airplane's carpet clean used to run into money. The wool carpeting used by airlines trapped dirt, soaked up stains, and got grimy fast. Whenever it needed dry cleaning, which was often, it had to be removed from the plane. Extra carpets had to be kept on hand for quick replacement. And any solution to the problem which sacrificed beauty of the cabin was unacceptable.

Then B. F. Goodrich engineers developed a process of embossing colored fabric with crystal-clear Avtrim flexible material. The color and pattern possibilities provided by the new method are practically limitless. With a sponge backing, the comfortable, cushiony feel of rich carpeting is kept.

This new flight rug far outwears other kinds. It resists scuffs and scratches. It can't be hurt by grease, oil, or ordinary stains and chemicals. Things that are spilled on it don't soak in, can be easily wiped up. Thorough cleaning is done with soap and water, without removing the rug from the plane.

Other BFG products for aviation include: tires, wheels and brakes; heated rubber; De-Icers; Plastilock adhesives; Pressure Sealing Zippers; fuel cells; Rivnuts; accessories. *B. F. Goodrich Aeronautical Division.*

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ESTABLISHED JUNE 1, 1937

World's Largest Aviation Publishers
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MAINLINER OF TOMORROW?—Examining a model jet plane of the type visualized in current planning for jet operations are (left) W. C. Mentzer, general manager of engineering for United Air Lines, and J. A. Herlihy, vice president of engineering and maintenance. The model may represent the Douglas DC-8.

United 'Flies' Jets in Planning Project

Two transcontinental flights daily are plotted in detail as UAL prepares for jet operations.

By FRED S. HUNTER

JETLINERS are flying coast-to-coast on regular schedule every day on United Air Lines—on paper.

Paper Jet—UAL's name for its highly interesting research project—consists of two hypothetical flights between New York and San Francisco daily, one in each direction. From them, UAL researchers are amassing data for the future when actual jet transports may be placed in service.

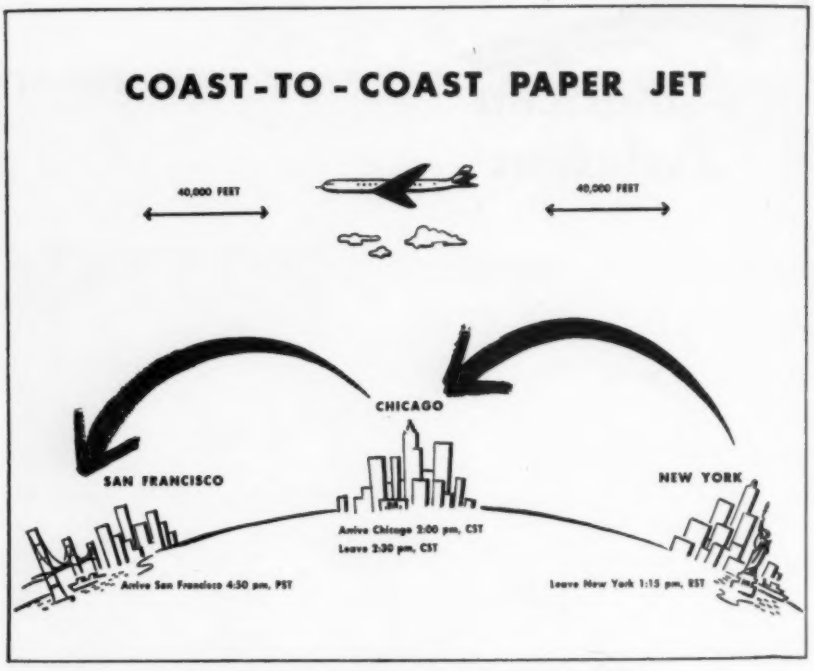
The simulated jet flights are planned with the meticulous precision of actual schedules in UAL's weather and dispatch offices. Initially, however, the studies are devoted to physical conditions of flight—winds, altitudes, temperatures, en route weather, visibility. Later, their scope will be increased step-by-step to include all phases of operation. The project is to be extended over a period of two years or more.

Paper Jet originated with J. A. Herlihy, vice president-engineering and maintenance, who watches it closely from his San Francisco office. Ray D. Kelly, superintendent of technical development, is captain of the test crew. Research meteorologist Howard Kaster is the current co-pilot.

UAL's hypothetical jet is engineered around a payload of 20,000 pounds, which the company's economic staff estimates is about right to return a profit. The craft has a gross take-off weight of 180,000 pounds and is powered by four turbojet engines developing 10,000 pounds thrust each, without afterburners. The design incorporates enough sweep to provide for a cruising speed of 550 mph and the ship climbs at 4,000 to 5,000 feet per minute. It is stressed for cabin pressurization for a safe margin at 40,000 feet. Range is 3,000 miles; fuel capacity 15,000 gallons. It carries up to 80 passengers in a standard density version and has space for up to 8,000 pounds of cargo. It is equipped with dive brakes to quickly retard speed. It is designed to take-off and land on existing runways at New York, Chicago and San Francisco, or at alternate airports. Its break-even load factor is calculated roughly at 30%. It is operated by a crew of five.

The Paper Jet is an elastic vehicle. It was designed by UAL's development engineering division without reference to any manufacturers' projects. But it is subject to change, and UAL has every intention of making changes in it from

it had to burn off part of the fuel load



LUNCH IN NEW YORK, dinner in San Francisco is the schedule made possible with jets, as United plans it.

time to time during the two-year study as information becomes available from aircraft and engine manufacturers as their jet designs progress.

It is interesting to note that UAL excludes afterburners. This is because of the carrier's typical apprehension about aggravating the noise nuisance. The airlines have told the manufacturers they don't want afterburners. The manufacturers in turn tell the airlines they may have to accept afterburners to gain operating load economies. The alternative is to wait a couple of years longer for engines having higher thrust.

"We hope the cities will extend their runways," commented Paper Jet Captain Ray Kelly. Capt. Kelly and Copilot Kaster are contemplating the approach of summer. They've been doing fine on loads during the winter months when temperatures are favorable. They hope July and August at Chicago (the critical airport) can be compensated for without undue pain.

The Paper Jets began transcontinental service November 17, 1952. Jet No. 1 (odd number for westbound) took off from Idlewild on schedule at 1:15 p.m., ETS, and arrived in Chicago at 2 p.m., CST. It left Chicago at 2:30 p.m., CST, and landed in San Francisco at 4:50 p.m., PST. Thus the Paper Jet inaugural demonstrated a peek into the future, so to speak: lunch in New York and dinner in San Francisco. Stewardesses would love this kind of scheduling.

Similarly, Jet No. 2 (even number for eastbound) left San Francisco at 7:30 a.m., PST, and arrived in Chicago at 1:15 p.m., CST. After a 30-minute stop, it proceeded to Idlewild and arrived there at 4:15 p.m., EST.

With one exception, UAL treats its Paper Jets just as though they were regular equipment being operated along with its DC-6's and Convair-Liner 340's and by the same personnel. The one liberty UAL takes is to make one flight do the work of two in streaking east and west between the two coasts. It does this by making the Chicago stop for fuel and exchange of passengers on the one hand and then operating the same trip non-stop between Idlewild and San Francisco. This is to get a line on both types of performance.

No Privileges

Similarly, UAL gives its Paper Jets no special privilege. They are fitted into the traffic approach patterns without special consideration. The same minimums that apply to UAL's DC-6's flying the same route apply to the jets. Allowance is made for the same one hour of holding time at a planned destination and the same procedure is followed in proceeding to an alternate after holding.

A typical Paper Jet trip starts in the office of research meteorologist Kaster. He determines the best altitude for the trip to fly, its cruising speed, route, fuel load, and arrival time in Chicago.

The trip is then planned into the traffic pattern at the San Francisco International Airport and is dispatched like any other Mainliner. The flight plan is relayed to dispatch offices at Chicago and New York. This information includes Kaster's estimated flight time to Moline, Ill., which is the check point UAL uses for flights coming in from the west. If this were a westbound flight the check point would be South Bend, Ind.

At Moline, the Chicago dispatcher takes over. He has Kaster's flight plan showing altitude over Moline, fuel left in the tanks and other pertinent information, including the alternate, which normally is Milwaukee. He acts in accordance with the local weather situation. If favorable, he inserts the trip into the Chicago traffic pattern and brings it in for a landing. The letdown into Chicago is made at reduced power, but with all four engines operating. Later, as it progresses into studies of fuel economies, UAL will paper test shutting off two engines.

New Flight Plan

If the weather is unfavorable, the Chicago dispatcher may hold the airplane for the weather to raise to minimums or he may route it to an alternate. Should an alternate other than the original be used, the Chicago dispatcher notifies Kaster, who immediately files a new flight plan for the rest of the trip.

The same procedure is followed as the flight is continued on from Chicago to Idlewild. The plane is checked in over Selinsgrove, Pa., where the dispatch office on the New York end of the line takes over.

The paper flights already have yielded information which will influence UAL's future operation of jet transports. The weather advantages afforded by 550 mph are clearly being demonstrated on UAL's flight logs. A nonstop San Francisco-Chicago trip has the same advantage weather-wise as a DC-6 trip from Denver to Chicago. This in turn means that "stack time" and similar operations problems brought on by weather will be made simpler for long range flights by the faster jets.

Jets, of course, are unable to stay in holding patterns as long as DC-6's. Holding is more expensive, too. But in its Paper Jet project UAL has seldom found it necessary to make use of alternate airports. Jet No. 2 has been forced to hold over New York for periods of 10 to 27 minutes, but no holding period thus far has demanded fuel quantities greater than the normal reserves carried.

For its coast-to-coast non-stops, UAL has been able to operate its Paper Jets consistently at full payload with fuel loads of 13,500 gallons and cruise at 40,000 feet, the altitude where the turbojets are most efficient. Only rarely has

it had to burn off part of the fuel load at 35,000 feet before continuing the climb to 40,000 feet.

Winter winds, the UAL record also shows, are stronger at 30,000 and 35,000 feet and more moderate at the 40,000-foot level where the jets operate best. Moreover, all indications are that instead of complicating jet transport operations upper wind variables will simplify it. Kaster puts it this way:

"No pilot need stay in the jet stream more than 15 or 20 minutes unless he wants to."

UAL's paper jets have encountered wind velocities up to 180 mph. But only for short distances; never more than 200 miles. Very often, Kaster reports, 50 miles to one side at 40,000 feet will cut speed 50 mph.

It's apparent pressure pattern flying will be less important to the pilot moving over from piston engines to the jets. A 100 mph headwind, for example, reduces the 300 mph cruising speed of a DC-6 by 33%. The same wind cuts the 550 mph cruising speed of a Paper Jet by only 18%.

Only Five Minutes

Howard Kaster puts it another way: "For an airplane that will cruise at almost 10 miles a minute, a 50 mph headwind is only five minutes."

UAL's records show the following experience in average flight times on its Paper Jet schedules:

San Francisco to Idlewild (non-stop) .....4 hrs., 35 min.
San Francisco to Chicago .....3 hrs., 25 min.
Chicago to Idlewild .....1 hr., 25 min.
Idlewild to San Francisco (non-stop) .....5 hrs., 45 min.
Idlewild to Chicago .....1 hr., 50 min.
Chicago to San Francisco .....4 hrs., 15 min.

These are flight times, not block-to-block. Taxi time (or towing time), delays at the end of the runway, loading delays, etc., have not as yet entered into UAL's paper project.

Although UAL's study is really just starting and has many months to go, its paper record indicates how upper wind variables are minimized by 550 mph speeds. In December and January, two winter months when the weather on the ground is not at its best, 84% of Jet Flight 2's flights from San Francisco to Chicago arrived within plus or minus 10 minutes of the average time of three hours, 25 minutes.

Another favorable circumstance is that the upper winds balance out pretty much. A high velocity breeze in the east like as not will be offset by zero wind in the west.

• • •

Harmar D. Denny, Jr., 67-year old ex-Pennsylvania Congressman, nominated by President Eisenhower to fill the vacancy on the Civil Aeronautics Board. A Republican, Denny will give the CAB its first Republican majority in history, if the Senate confirms his nomination. His term of office would run through December 31, 1953.

Fred B. Lee, deputy administrator of CAA since 1947, has been nominated to succeed Charles F. Horne as Civil Aeronautics Administrator. The nomination is subject to Senate confirmation. A graduate of Harvard Law School in 1931, Lee practiced law in New York for 10 years prior to five year's service in the Navy (1941-1946).

United Aircraft: $17.8 Million Net

A net income of $17,809,391 has been reported by United Aircraft Corporation for 1952, or $5.18 a share on sales of $667,769,234. The organization's net and sales are the highest recorded for any company in the aviation industry thus far, and are expected to remain the highest even after reports of remaining aviation companies are released.

The 1952 net, which amounts to 2.7% of sales, compares with a net of $14,266,867, or $4.06 a share on sales of $417,211,980 for 1951. However, the return on sales for 1951 equalled 3.4%. Total backlog climbed from $1.3 billion at the end of 1951 to $1.46 billion as of last December 31.

On the Cover: Boeing's Bomarc

THE U. S. Air Force's first pilotless fighter, designed specifically to defend the continental United States against atom-bomb-carrying supersonic bombers, is the Boeing F-99 "Bomarc," shown on the cover. The Bomarc uses a fuselage-buried rocket engine to push it to high altitudes and supersonic speeds, at which point the underslung ramjet engine takes over.

Radar and other electronic gear in the fuselage is used to locate, track, and crash the Bomarc into enemy aircraft. An explosive charge in the plane's nose destroys the hostile aircraft. Developed from Boeing's experimental GAPA (ground-to-air-pilotless-aircraft), which was under test between 1945 and 1949, the F-99 is now in large scale production at Boeing's Seattle, Washington, plant. As the first step toward an autonomous Pilotless Aircraft Division, Boeing has just set up a pilotless aircraft unit headed by A. W. Jacobson as manufacturing manager, with W. E. Ramsden as experimental department manager.

At least one other pilotless fighter guided missile is now in production for the USAF, the Hughes F-98 Falcon, which will be carried by and fired from the supersonic F-102 interceptor now being built by Consolidated Vultee. The Falcon, however, is an air-to-air missile. Other pilotless aircraft projects also under way for the U. S. Air Force include several bombers: the Martin B-61 Matador, Northrop B-62 Snark, Bell B-63 Rascal, and the XB-64 and XB-65.

Rocket firing device in the North American Aviation F-86D interceptors unleaches Mighty Mouse 2.75" rockets from retractable launching pod, which operates hydraulically and pops out of the plane's fuselage. Immediately after firing, the pod snaps back into the airplane to restore its streamlined configuration for near-sonic flight. The ship carries 24 rockets in the launching pod, each the equivalent of a 75 mm shell. Designed as a high-altitude, all-weather interceptor, the F-86D is powered by a General Electric J47-GE-17 engine officially rated at 5200 pounds thrust, plus afterburner. It has a maximum gross take-off weight of 18,000 pounds and a service ceiling of over 45,000 feet. Tactical radius is approximately 500 miles.

New Group to Try Industry Stabilization

History repeats as latest in long string of committees goes to work on industry ups and downs.

By Robert M. Loebelson

THE AIRCRAFT INDUSTRY, which has been trying to convince its principal customer, the military services, that a long-range plane procurement program would enable them to obtain airplanes far more cheaply than the traditional rapid expansion and contraction set-up, will soon get another chance.

A new committee under the Office of Defense Mobilization is about to be created—a committee whose sole function will be to make recommendations on how aircraft, engine, and propeller manufacturers can be assured of a reasonable level of production in peacetime so that when an emergency arises and more planes are needed in a hurry, the industry will be able to expand much more quickly than in the past.

Present indications are that Harold R. Boyer, former chairman of the now-extinct Aircraft Production Board and now running General Motors' Cadillac tank plant in Cleveland, will be chairman of the new committee. "Bill" Boyer has already been conducting exploratory talks with acting ODM director Arthur S. Flemming and ODM consultant Harold S. Vance, president of Studebaker Corp. Vance and Boyer have reached the point where they are discussing other members of the as-yet-unnamed committee, probably well-known names outside the aircraft industry.

Boyer's group in a sense will serve the same function as Vance's Advisory Committee on Production Equipment, which earlier this year submitted a blueprint for long-range stockpiling of machine tools and standby plants (American Aviation, February 16). And Boyer himself will be no novice at understanding the boom-and-bust situation perennially confronting airplane firms.

If history repeats itself, the recommendations of Boyer's committee, valid and logical though they may be, may well be completely ignored or barely acted upon.

The top men in the aircraft industry have appeared before numerous similar committees in the last 30 years, presenting telling arguments. In every case, the committee was convinced by the arguments presented and subsequently recommended a program for stabilizing the output of plane companies during the between-mobilization periods.

Also in every case, however, those recommendations proved fruitless, and even today the industry faces a contraction after the present mobilization period ends—a contraction which would again mean abandoned aircraft plants and the loss of a skilled labor force.

Among the various committees which have looked into the situation in the years since World War I, and which condemned the lack of governmental foresight were:

• **1923—The Lassiter Board,** which reported that 90% of the World War I aircraft industry had been liquidated and that the remainder would inevitably disappear under then-prevailing conditions.

• **1924—The Lampert Committee** of the House of Representatives, which was dismayed by the "lack of continuity of Government orders."

• **1925—The Morrow Board,** appointed by President Coolidge, which urged "the adoption of a policy of continuity in orders and of a standard rate of replacement."

• **1935—The Federal Aviation Commission,** appointed by President Roosevelt, which declared, "Every effort should be made to organize procurement policy so that the supply of each general type of aircraft for replacement and for modernization should proceed at a substantially regular rate."

• **1948—The President's Air Policy (Finletter) Commission,** named by President Truman, which urged that "year-to-year planning of aircraft production . . . must give way to long term planning."

• **1948—Congressional Aviation Policy Board,** set up by both the House and Senate, which recommended that Congress "should authorize a succession of five-year programs . . . for research, development and procurement of aircraft for the purpose of maintaining a rapidly expandable production industry."

Boyer's group undoubtedly will reach similar conclusions and make similar recommendations. Will those findings again be ignored, or has the U. S. really reached the point where it is ready to recognize the advantages of a stabilized aircraft industry?

• • •

Pioneer's Survival Threatened by CAB Action

Refusal to supply extra mail pay may sound death knell for both local line and Martin's airplane.

By William V. Henzey

THE Civil Aeronautics Board on Friday, March 13, turned down Pioneer Air Lines' request for mail pay sufficient to meet expenses of operating Martin 2-0-2 aircraft over its local service airline system. The decision may mean the end of Pioneer. It does mean the end of the Martin 2-0-2 as a DC-3 replacement for local service lines.

The Board's decision was unanimous and so emphatic that little hope for reversal existed, although Pioneer at press time was preparing to file for reconsideration. These developments followed the decision:

• **Pioneer immediately** cut back its schedules by one-third, curtailed purchases and advertising, and furloughed many of its 450 employes.

• **Communities** served by Pioneer in Texas and New Mexico, along with the Texas delegation to Congress, deluged CAB's offices in Washington with wires, letters, and phone calls in what one CAB member described as the "heaviest pressure" to which the Board has ever been subjected.

• **Pioneer's officials** called emergency meetings to plan a course of action, with alternatives being (1) continue Martin service without CAB mail pay support; (2) sell the Martins and restore DC-3 service; or (3) go out of business.

• **CAB members and staff,** advised of possible termination of Pioneer's service and immediate suspensions, began studies to arrange for an emergency method to fill any vacuum created by termination or suspension of service by using other airlines.

• **Pioneer,** on March 18, filed with CAB for emergency mail pay relief of $846,000 in lump sum payments and increased rates for the future. It also filed, simultaneously, an application to suspend service over its entire system if CAB did not act by March 23. Reason: It had no other place to turn.

That was the situation as this issue went to press.

Behind these developments was Pioneer's decision early in 1952 to replace its fleet of eleven DC-3 aircraft with nine post-war Martin 2-0-2 planes purchased from Northwest Airlines. On April 2, 1952, it applied to CAB for higher mail rates to cover the cost of operating the larger aircraft, which it put in service on June 1, 1952.

Although there apparently was no comment from CAB to the Securities & Exchange Commission on a registration statement covering a stock issue for the planes, opposition to the deal in the Board was readily apparent.

On March 7, CAB wrote Robert J. Smith, Pioneer president, that it wasn't pleased with the equipment switch and, at that particular time, did not feel as though it would grant higher mail pay. Nevertheless, the proceeding moved through normal channels.

CAB's air operations bureau, a party to the case, through one of its attorneys, Allen C. Lande, indicated early in the case that the bureau was opposed to the mail pay increase and believed Pioneer should only be paid what it normally would get if DC-3 operations could be continued.

This, essentially, is what the Board adopted as its final decision. It was one of the strongest Board decisions in its 15-year history.

Estimates and Actualities

Based on estimates and forecasts submitted in the case and on the actual operating record of Pioneer with the Martins for the first six months of such service, CAB concluded that over a five-year period approximately $3.4 million more mail pay would be required than if DC-3's were continued in service.

CAB thus set $5 million as the mail pay for Pioneer for the five-year period beginning April 2, 1952, as contrasted with about $8.4 million that it said would have been necessary to meet the cost of operating Martin 2-0-2's.

Comparing the original Pioneer forecasts with actual operating statistics for the first six months, CAB said: "Instead of the forecast 50% increase in revenue passenger-miles and traffic density, the carrier realized a 17% increase in revenue passenger-miles and a 29% increase in traffic density." Part of that growth, the Board added, must be considered "normal traffic growth" which would have occurred had DC-3's been used.

Further, the agency said, "it is to be noted that Pioneer's forecast of expenses, 124.63¢ per plane-mile, has been substantially exceeded by its experienced average costs in the first six months of Martin operation; this latter figure is 145.80¢ per plane-mile. The result of the carrier's experience for this six-month period is a requirement for substantially more mail pay to support Martin operations than would be required for an entire year of DC-3 operations ($1.3 million for six months with Martins; $1,000,500 for a year with DC-3's)."

The Board was critical of Pioneer's management for its decision to switch aircraft. It was critical of the company's lack of preparation in its cost forecasts for initial difficulties with new aircraft. It was critical of management for "not having more thoroughly explored expansion of DC-3 capacity as a means of meeting such unsatisfied demand for local air service on its route as it might reasonably have forecast."

In Dallas, Pioneer officials said, "We are grievously shocked." At the time of the CAB decision, the company was losing $3,650 a day. Counting on CAB mail pay support, it had, while the case was pending before CAB, borrowed $500,000 because of the lack of working capital. This was to be paid back out of an anticipated mail rate increase.

Also to be met by more mail pay were installments on long-term notes totalling $2,070,000. In its March 18 petition to CAB for emergency relief, the company said its "working capital is now completely exhausted."

The company was then in technical default on its long-term credit agreement, with payments due in the immediate future on both the next installments of its long-term loan and payment on its short-term loans. "Pioneer is simply unable to borrow additional funds from any source at this time," the firm declared, "because its situation and its prospects under the Board's March 13 order will not warrant such further loans."

Aside from its critical impact upon Pioneer, the CAB decision practically ruled out the Martin 2-0-2 in the local field. But, the Board pointed out, "this does not mean that we have receded from our firmly held position with respect to the urgent need for DC-3 replacement by a specially designed aircraft for local service operations. We have supported, and will continue to support, the enactment of appropriate legislation for development of prototype aircraft for this purpose."

"Nor do we mean by our decision in this case to indicate that we would under no circumstances underwrite a shift by a local service carrier from the DC-3 to other aircraft. We only decide that under the circumstances of this case we would not be discharging satisfactorily our responsibilities, particularly to the taxpayers, if we underwrote, at the greatly increased mail pay required, Pioneer's shift to Martin equipment."

• • •

Merger Possible Soon Between ACTA, IMATA

The nation's two associations representing large irregular airlines are discussing a merger but were still far apart as this issue went to press.

Aircoach Transport Association, claiming 40 member airlines, and the Independent Military Air Transport Association, claiming 14 members, both want to merge to form a consolidated organization. In fact, ACTA has submitted a formal merger proposal to IMATA.

But IMATA head Ramsay D. Potts, Jr., expressed dissatisfaction with the method chosen by ACTA to begin negotiations. Potts said his group had authorized him to negotiate with an ACTA representative. He so notified ACTA. But the next step was a resolution adopted by ACTA's board of directors and released almost simultaneously to IMATA and the press outlining ACTA's terms for a merger.

Potts told AMERICAN AVIATION, "This is the first time I've heard of a merger in which the press was advised at the same time as one of the potential merging partners."

Meet Any Time

Philip A. Mann, spokesman for ACTA, which has been without a president since the February 15 resignation of Amos E. Heacock, after tendering the offer to IMATA said he would meet "at any time" with Potts or other IMATA officials.

"In one strong consolidated association," he said, "the carriers would be in a better position to expand their present operations and increase the vast airlift represented by the industry which is so vital to our national defense effort."

Both organizations act as liaison between their members and the military in arranging charter flights for the military. Numerically ACTA is the larger, but IMATA's members are, on the whole, larger carriers.

That the ACTA proposal to merge probably wouldn't be accepted in its present form was indicated by Potts, who appeared displeased with various provisions, including one which would give ACTA five places on a seven-man board of directors.

Potts also expressed displeasure because the ACTA offer was open first to IMATA as an organization and second to individual members of IMATA who may wish to join ACTA.

At press-time, Potts was presenting ACTA's proposal to individual members of IMATA for their views.

News Briefs

First Navy Turbo-Compound-powered R7V-1 Lockheed Super Constellation has been delivered and has been assigned to flight crew training at Patuxent, Md. It will later serve with the Fleet Logistic Air Wing in the Atlantic, while the second one delivered will join MATS in the Pacific.

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Sales of almost $95 million during the six months ending January 31 brought **Northrop Aircraft a net profit** of just over $2 million, or $3.16 a share. This was almost double the corresponding profit for the year before, although sales were up less than 20%.

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Aeronca Manufacturing Company also reports that profits doubled. In 1952 the figure reached $852,152, as compared with the 1951 net of $418,246.

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The Air Force's **T-1 altitude suit** has successfully passed tests up to 106,000 feet in altitude chambers. Two hundred of the suits have been distributed to military and civilian test pilots.

• •

New York's airport kettle continues to boil. A state Assembly committee in Albany heard testimony from John Groves, New York regional operations director for ATA, on the disastrous consequences of a proposal to **prohibit flight below 5,000 feet** over schools, hospitals, and places of public assembly. On Long Island, civic groups are planning a **public rally to protest low flying** out of La Guardia and Idlewild, while in New Jersey the Mayors' Committee on Newark Airport has decided to strike at the noise complaint rather than crash hazards in its **forthcoming legal action.**

• •

The Flying Tiger Line would carry **freight across the Atlantic at 24c a ton-mile,** according to George T. Cussen, vice president, one of six applicants looking for a trans-Atlantic all-cargo certificate. Cussen dismissed the present air freight traffic across the ocean as "inconsequential."

• •

Airlift capacity between Berlin and Hamburg increased some 20% as **Seaboard & Western Airlines** put DC-4 equipment to work under a contract with the Berlin Senate. Carrier will transport some 220 tons of freight weekly. A group of British freight carriers have been running an airlift from Berlin for the last 18 months.

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A commemorative stamp honoring the "Golden Anniversary of Aviation" will be issued some time this year, according to the Post Office Department.

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First of **Sabena's eight Douglas DC-6B's** has been handed over to the carrier and was flown to Brussels by Anselme Vernieuse, vice president of operations.

• •

Use of the Airspeed Ambassador as **flying test bed** for engines is seen as a possibility following announcement that testing of two **Bristol Proteus III** turboprops was scheduled to begin this month. The Napier Eland turboprop and the Napier Nomad compound are possible successors in such a test program.

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Co-pilot and captain training at United Air Lines goes on apace. Carrier's Denver flight training center expects to process 120 co-pilots and 275 prospective captains this year.

• •

Three new DC-6B's were scheduled to be on the roster of Slick Airways by the month's end. With one of the carriers older DC-6B's transferred to Japan Air Lines, the total stands at four; in addition, Slick has 20 C-46's.

• •

Cooler, safer C-46 engines are reportedly the result of a series of tests completed in Miami. The Aircraft Engineering Foundation and the American Airmotive Corporation of Miami ran the tests, which will now be followed by CAA testing. Engines reportedly ran 20% cooler than before modification.

• •

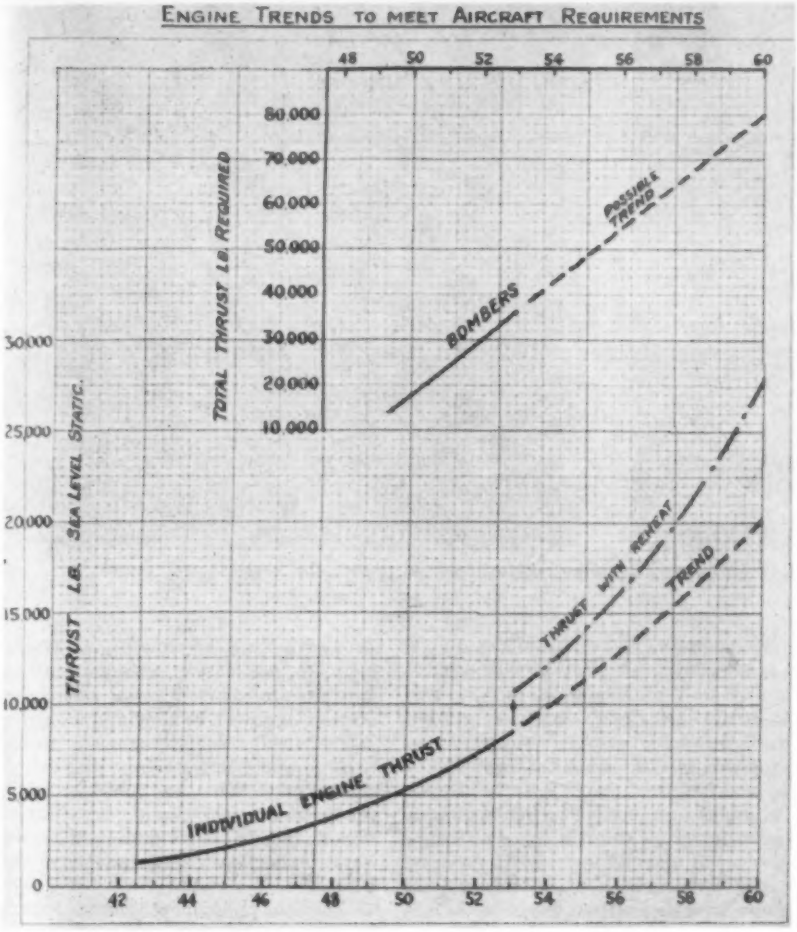
It's either feast or famine with the **private maintenance contractors,** and the government is to blame, according to the president of Pacific Airmotive Corporation, Thomas Wolfe. **Irregular scheduling** is leaving companies like PAC with unused capacity, says Wolfe.

• •

Everything went over the top for United in '52. A **net profit of $10.6 million** after taxes amounted to $4.03 per share of common stock, highest figure in the carrier's history. Operating revenues and expenses both hit record peaks, while coach traffic totalled 20,600 plane-miles daily, up 100% from 1951.

• •

A two-year, million-dollar contract has been given to Lockheed Air Service-International by Avianca. The carrier's fleet of Constellations will be completely covered by the contract, which takes effect in April, 1954, and which will be based on a **fixed price per flight-hour.**



USE OF AFTERBURNERS is an increasingly important design factor in boosting power.

British Jet Engine Plans Revealed

Thrust of 30,000 pounds by 1960 foreseen by Supply Ministry official; development described.

By ANTHONY VANDYK

JET ENGINES with thrust ratings of almost 30,000 pounds will be available by 1960 to meet British military requirements. At the same time as the power is being stepped up in the engines now on the drawing boards in Britain, fuel consumption is being cut down.

These and equally impressive developments have been disclosed in the form of charts, reproduced on these pages, by Air Commodore F. R. Banks, principal director of engine research and development at the British Supply Ministry.

In an address before the Institute of the Aeronautical Sciences in Cleveland this month, Britain's top engine development man pulled no punches in discussing both the theoretical and practical sides of aviation engine development. Pointing out that there are only a few companies in the world today which really understand the art of developing and building a successful aviation engine, and which can carry the whole effort through effectively and expeditiously, Banks sounds three specific warnings:

- **Don't let non-aviation** industrial firms develop your gas turbines.
- **Don't let bankers** and accountants decide your firm's technical policy.
- **Don't let any changes** be made from the original purely to facilitate production of a licensed engine.

As the man who ordered such engines as the Nene, Ghost and Sapphire, Air Commodore Banks has intimate knowledge of gas turbine development and production problems. He considers that it will take another 10 years for those non-aviation industrial organizations remaining in this very specialized field to master the design technique and development of the aviation engine—and then only if they are willing to learn by bitter experience. And then, he wonders, where will the *successful* aviation firms have progressed by that time?

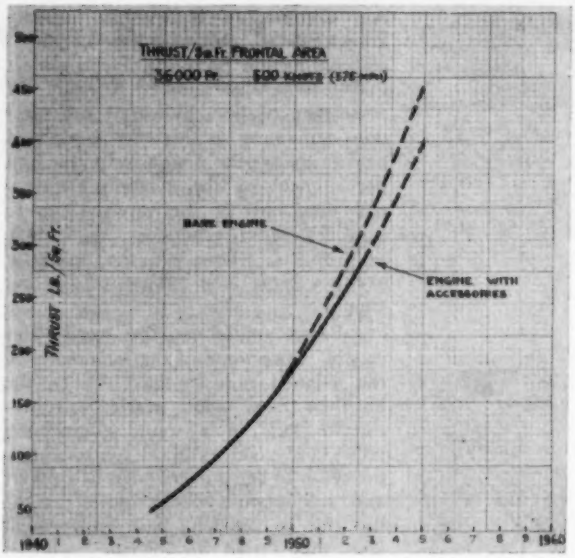
Banks underlines the word "successful" since some of the legitimates in the aviation industry have "fallen flat on their faces"—and nearly to ruin—due to lack of a sound engineering policy and good technical control; or as the result of being overridden by bankers and accountants, who came in at the top due to previous bad management and then tried to dictate technical policy.

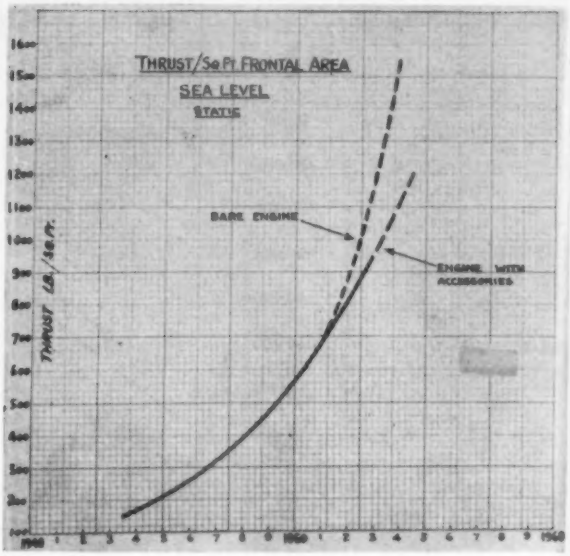
To be first in producing good engines, Banks says, it is essential that you be enthusiastic; and then you must create an organization that can make, break, remake and, finally, produce engines more quickly than your competitors. The ability to "make and break" engines rapidly, and to keep a flow of experimental engines that practically swamps the test benches, is the only known way of successfully developing an aviation engine. You can usually single out a successful firm by the number of engines you see or hear on test during a year of visits, according to Banks.

Banks considers that there is one important difference between British and American practice as affecting the rapidity of prototype engine manufacture—Britain still has some good trade or craft apprentice programs in engine firms which produce skilled workmen (fitters and machinists) with the result that experimental engines can be built relatively quickly and with the minimum of jigging and tooling.

Although the British aircraft industry is currently short of skilled labor and lacks a sufficient number of highly qualified men coming from the universities and technical colleges, Banks believes that Britain has a more stable condition in design offices. He suggests that in the U. S. the young man does not generally take kindly to the idea of spending some years engaged upon engineering design and can earn better promotion and money on the production floor or in the field; in Britain a designer is thought to have quite a promising professional career ahead of him and can eventually become chief engineer of his firm.

Discussing recent articles in the American press asserting that Britain





FRONTAL AREAS are being kept relatively small despite big increases in power, the charts above reveal.

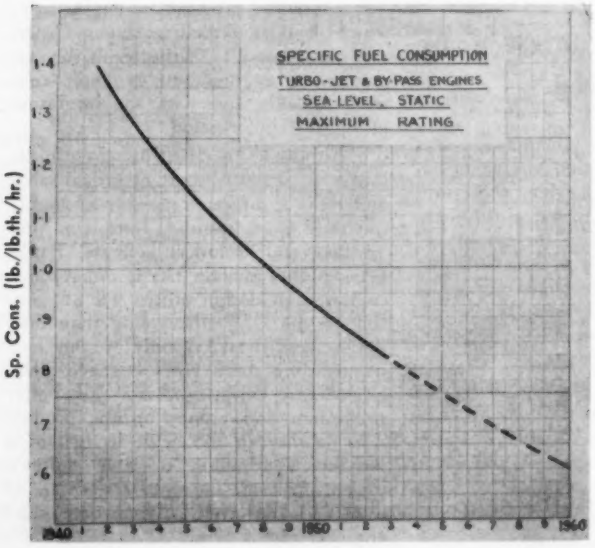
designs engines which are difficult to produce in quantity, Banks says that this is certainly not the case when considered in terms of production costs. When considering a licensed engine, it is very important not to make any changes from the original purely to facilitate production (this is an apparent reference to the engineering and material changes made by Curtiss-Wright in the J65 version of the Armstrong-Siddeley Sapphire). In fact Banks holds that a licensed engine should be an exact "Chinese copy" of the original, both in regard to materials and manufacture.

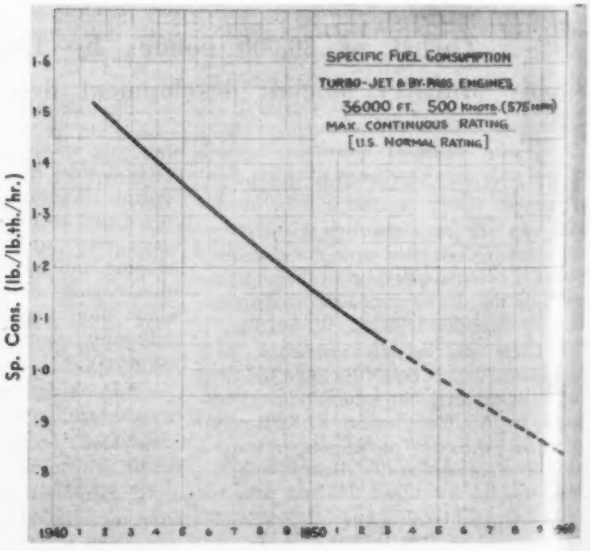
He points out that although one particular engine (presumably the Sapphire) had already passed the type or model test when the license was acquired by a U. S. manufacturer, it was then still in the early development stage and, therefore, was very vulnerable to engineering and material changes. Banks agrees, however, that it is quite natural to acquire the license for an engine in its early development in order to ensure the most up-to-date product.

He notes, incidentally, that the engine in question has less critical material in its make-up than existing engines and is, therefore, all the more acceptable when considering wartime production.

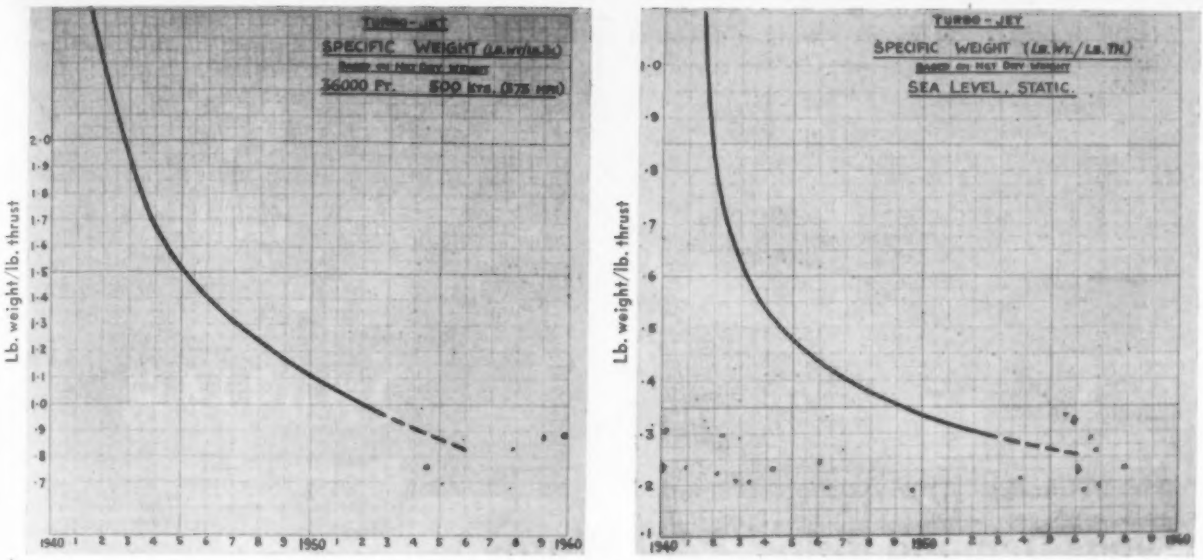
Great caution and restraint is needed on the part of the licensed firm in making any engineering change, particularly for production reasons, where production may just be starting or already in full swing; and if there are insufficient running hours behind the design change or modification, subsequent failure in production engines can lead to a chaotic state when dealing with the large production rates common to the U. S.

British philosophy is that a completely new aviation engine must first be made to work and give its calculated performance, and there should be little or no design compromise for production's sake at the risk of failure to





A MAJOR FACTOR in reducing fuel consumption will be the introduction of the by-pass engine (the Rolls-Royce Conway is the first big unit of this type).



SINCE THE LATE 'FORTIES there has been a steady decline in specific weight.

achieve the performance requirements. If, however, the production order is sufficiently large to warrant, later, a reconsideration of the design of a particular component to help manufacture, the redesigned part must be subjected to considerable and intensive experimental running before it is finally approved and introduced in the engine drawings. This is, of course, easier to accomplish with Britain's smaller production quantities.

Contrary to optimistic prognostications of six or eight years ago, when it was thought that the turbojet could be designed, built and type-tested within two years, the modern axial engine takes about the same time to bring to the type test stage as did the larger and more complicated piston engine. But the gas turbine, whatever its type, gets through the flight test stages and into actual service much more quickly than the piston engine—principally due to the considerably reduced mechanical and installational problems and the almost complete lack of cooling requirements. The day-to-day inspection and maintenance of the gas turbine in military and in airline service absorbs far fewer manhours than does piston-engine inspection.

Discussing the rate of engine development, Air Commodore Banks states that the design of an axial turbojet of 8,000-10,000 pounds static thrust absorbs about a year, and a further 12 months or more will be required to build the first prototype engine—or, say, two years from the first line on the drawing board to the test bench, ready to run.

Then in the following three years there should be completed 8,000-10,000 engine hours of bench running and about 20,000 hours of flight testing. From 3,000-4,000 engine hours of bench running is a good yearly figure in the fourth and fifth years.

Banks used to think that when a number of axial engines had been built there would be a reduction in this four or five-year period because of the greater accumulated knowledge of the axial compressor. But there are yet a number of problems to be mastered, and the old troubles of compressor stall and blade vibration and "flutter" are still met.

On the relative cost of centrifugal and axial engines, Banks points out that the axial type is now fully accepted on its own merits of superior overall performance. This does not imply that the centrifugal has been incapable of improvement, since any engine will respond to intensive development and there are still in existence some axials which are no better than, or as good as, the centrifugal. But the axial has practically all the advantages, although it is more costly to produce.

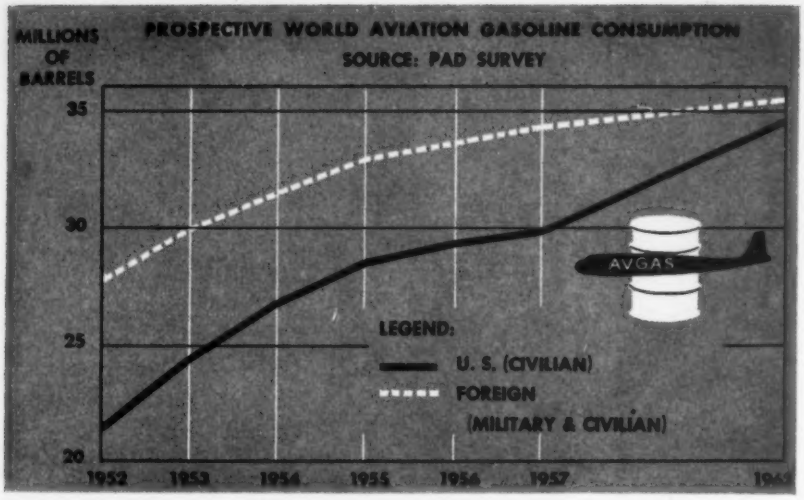
Britain's present experience, of relatively small production quantities, suggests that the axial's relative cost, in terms of dollars per pound of engine weight, would be about twice that of the centrifugal. If, however, the centrifugal were designed for the same pressure ratio as some of the present axials, then it would probably cost more than the latter—on the same costing basis.

Due to limited financial resources individual British firms have lacked all the facilities considered necessary for the performance testing and calibration of turbojet engines, particularly at simulated altitude conditions. Nevertheless, Banks states, by improvisation surprisingly close agreement has been obtained between component tests and the performance of the full-scale engine in the air.

For instance, insufficient power has been available to make compressor tests at full output and, therefore, all the compressors of large British engines have been tested and calibrated with restricted or throttled air inlets. Turbine design has been proved, and improved, by running part-scale wheels (having light alloy blades) on cold air, and the results have read across very satisfactorily to the full-scale components. Cold air testing permits the use of light alloy blades, which can be easily and rapidly manufactured when a new blade form is required.

The full-scale engines have then been instrumented, strain-gauged and calibrated in fighter aircraft, and two-way radio communication between the pilot and technical personnel on the ground has been used directly to report flight readings and to permit engine conditions to be altered and controlled as necessary. In this way the altitude characteristics of the compressor, etc. have been confirmed. Nevertheless, Banks admits that additional and more elaborate equipment—notably an altitude chamber for full-scale engine tests—is needed in Britain.

Air Commodore Banks concluded his address with a reminder that the engine is the most important part of the aircraft and urged that no effort be spared to ensure a healthy and successful engine industry. In this connection he remarks that it is the man that matters rather than the machine. • • •



Avgas Demand Rising, PAD Warns

Needs of next decade to rise 43%; may not be met unless production is increased.

WORLD-WIDE requirements for aviation gasoline, not counting either the U.S. military services or Russia and her satellites, are scheduled to rise nearly 43% in the next decade, according to a survey just completed by the Interior Department's Petroleum Administration for Defense, and the agency's deputy administrator, J. Ed Warren, warns that unless U.S. oil companies step up production the needs may not be met.

The PAD study shows that:

• **U.S. consumption** of avgas by airlines, corporation aircraft, private flyers, and other civilian users will go from 21.3 million barrels in 1952 to 34.5 million barrels by 1962, an over 60% increase.

• **Foreign civilian and military** aircraft, which used up 27.6 million barrels last year, will require 35.4 million barrels in 1962, a 28% hike.

Putting the two together, the 49 million barrels of avgas burned last year will have to be upped to nearly 70 million by the time 1962 rolls around. Use of aviation gasoline by the U.S. armed forces will apparently not diminish to any appreciable extent—at least not enough to improve the outlook for civilian and foreign users.

Warren reported that estimates submitted to his agency by the Defense Department's Munitions Board show that avgas demand for U.S. military planes will continue upward for several years before leveling off. "It is clear," he concluded, "that despite the advent of jet propulsion, total demand for aviation gasoline has by no means reached its peak. . . . Demand for conventional aviation fuel will continue at a high level for many years into the future."

PAD's survey indicates demand for grades under 100-octane will be generally downward in the next decade as far as civilian consumers are concerned, and will remain fairly steady for foreign consumers. There apparently will be a steady rise in the use of 100/130 (27% and 21%, respectively, for domestic and foreign aircraft).

Largest jump, however, will be in avgas grades over 100/130. Warren's figures indicate U.S. civilian use of fuel in this category will be upped from 2.3 million barrels last year to more than 12 million in 1962, while foreign aircraft, which required 1.5 million barrels last year, will need more than triple that amount (4.7 million), by the same date. (A barrel equals 42 gallons.)

PAD has been trying to get the nation's major oil companies to build more plants to provide one of avgas' key ingredients, aviation alkylate, without too much success. The oil producers have been reluctant to undertake such an expansion program without assurance that the alkylate plants will not just sit idle after the current emergency.

But as Warren pointed out, "Grade 115/145 and Grade 108/135 (which has a lower tetraethyl lead content) require nearly half again as much alkylate per gallon as Grade 100/130." Thus the demand for alkylate will rise even more sharply than the total avgas demand.

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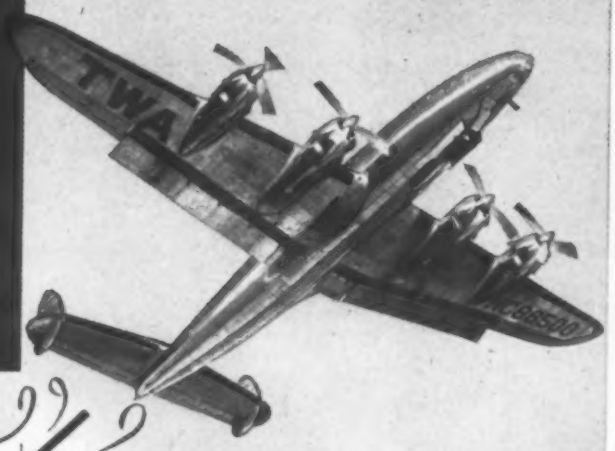
How Avgas Use Will Climb in Next Decade

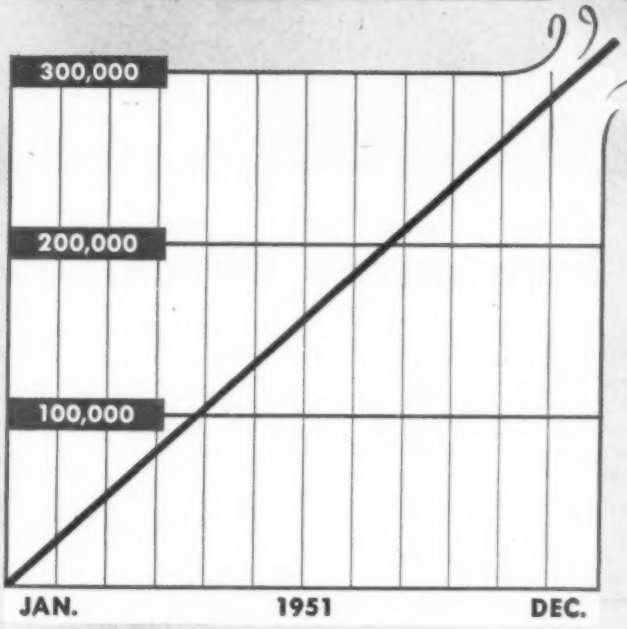
(In thousands of barrels)

Year	Under 100 Octane	100/130 Octane	Over 100/130 Octane		Total
1952					
U. S.*	3,805	15,282	2,287		21,374
Foreign**	4,026	22,106	1,501		27,633
Total	**7,831**	**37,388**	**3,788**	**Grand Total**	**49,007**
1953					
U. S.*	3,525	17,410	3,265		24,200
Foreign**	4,015	24,090	1,825		29,930
Total	**7,540**	**41,500**	**5,090**	**Grand Total**	**54,130**
1954					
U. S.*	3,245	17,955	5,335		26,535
Foreign**	4,015	24,820	2,555		31,390
Total	**7,260**	**42,775**	**7,890**	**Grand Total**	**57,925**
1955					
U. S.*	3,120	18,100	6,960		28,180
Foreign**	4,015	25,915	2,920		32,850
Total	**7,135**	**44,015**	**9,880**	**Grand Total**	**61,030**
1956					
U. S.*	3,025	18,250	7,750		29,025
Foreign**	4,015	26,280	3,285		33,580
Total	**7,040**	**44,530**	**11,035**	**Grand Total**	**62,605**
1957					
U. S.*	3,040	18,515	8,300		29,855
Foreign**	4,015	26,645	3,650		34,310
Total	**7,055**	**45,160**	**11,950**	**Grand Total**	**64,165**
1962					
U. S.*	3,060	19,420	12,050		34,530
Foreign*	4,015	26,645	4,745		35,405
Total	**7,075**	**46,065**	**16,795**	**Grand Total**	**69,935**

* *Civilian only* ** *Civilian and military, excluding Russia and satellites*

304,578 PUMP HOURS PER MALFUNCTION





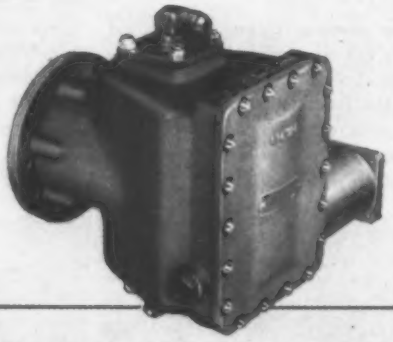
There can be no question of the reliability and lasting qualities of Vickers equipment when it hangs up records like this. TWA maintenance records for 1951 indicate only one unscheduled removal of a Constellation cabin supercharger drive pump in a total of 304,578 pump hours.

These TWA Constellations make use of numerous Vickers Hydraulic units. Besides variable displacement pumps (for main hydraulic system as well as cabin supercharger drive), there are hydraulic motors, pressure reducing valves, relief valves, unloading valves, and accumulators.

Vickers Hydraulic Equipment for aircraft is so widely preferred because it is compact, efficient, light weight . . . but above all dependable.

VICKERS

3000 psi VARIABLE DISPLACEMENT PUMPS ON TWA CONSTELLATION CABIN SUPERCHARGER DRIVES



This is the reversible flow pump used in the Constellation supercharger drive, one of a wide variety of variable displacement piston type pumps available from Vickers. For further information write for new Bulletin A-5203.

VICKERS Incorporated

DIVISION OF THE SPERRY CORPORATION

1502 OAKMAN BLVD. • DETROIT 32, MICH.

4827

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

ELECTRONIC integrator sends corrected flow data to indicator.

Accurate Fuel Flow Instrument Developed

THE GAVCO Corporation of New York, N. Y., has introduced a new fuel flow measurement system called the Gavco Mass Flowmeter, an electronic-mechanical device which measures fuel density within an accuracy of plus or minus one percent and fuel volume flow within one percent, combining the two to give the pilot a direct reading of fuel consumption in pounds per hour, regardless of pressure, velocity, humidity, viscosity, and temperature.

The complete system weighs less than eight pounds, occupies about ⅕ cubic foot of space, and is made up of these component parts:

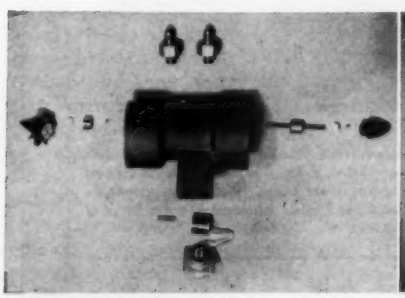
• **Flow sensing element:** Installed in the fuel line at any desired location, it measures the flow of fuel in gallons and feeds the flow data to an electronic integrator where it is combined with density data and relayed to the dial indicator. Pressure drop through the element is said to be negligible—less than one psi at 20,000 pounds per hour flow. Unit measures 3½" and requires only three to four inches of straight line run for installation, its performance being unaffected by proximity to elbows and other line deflections.

• **Density detector:** Also located in the fuel line, it continuously weighs samples of fuel passing through the line and feeds the true weight information to the integrator. It is capable of measuring a minimum change of one percent in fuel density and can accurately measure the density of fluids flowing at the rate of 70,000 pounds per hour through a 1¼" line.

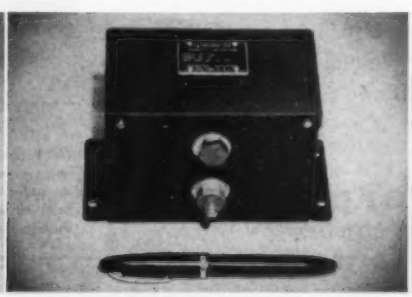
• **Electronic integrator:** Receives flow information for the flow sensing element and density data from the density detector, compensates the flow data for the true weight of the fluid, and sends the corrected data to a dial-type indicator, which gives a direct reading of fuel consumption in pounds per hour.

Designed primarily for jet aircraft installations where fuels vary in weight as much as ½ pound per gallon and density changes as high as 10% occur in high altitude operation. The Gavco system is equally adaptable to piston-engine aircraft. Operating from a power source of 110-volt, 400-cycle, single-phase alternating current, its components can be used individually for installations where either flow or density information alone is desired. The indicator can be used as an independent potentiometer for varied measuring services.

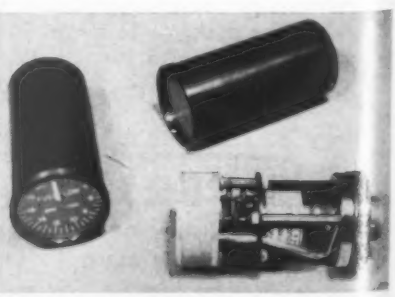
Present selling price of the Mass Flowmeter system complete is about $1250, modified by quantity. All components are available, according to Gavco, ready for assembly into units as ordered. A subsidiary of General Aviation Corporation, Gavco is located at 500 East 80th Street, New York City.



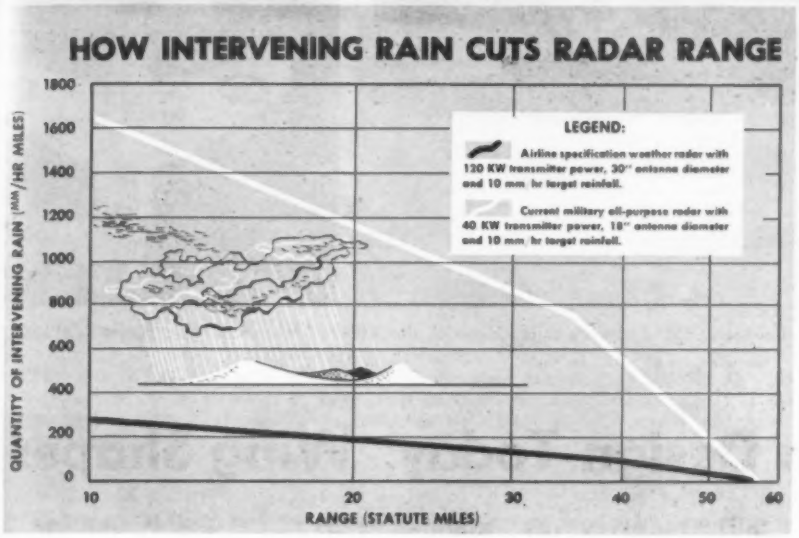
VOLUME SENSING unit measures fuel flow.



DENSITY DETECTOR samples fuel weight continuously.



INDICATOR gives direct reading of fuel consumption.



Airborne Weather Radar Standard Set

Wavelength of 5.7 centimeters holds greatest promise for airline use, report proves.

By JOSEPH S. MURPHY

THERE is no longer any room for doubt in the minds of manufacturers interested in producing a commercial airborne weather detecting radar as to the wavelength that will have to be used if the equipment is to be sold.

Airline interests, particularly the Air Transport Association, which has been spearheading weather radar research, and Aeronautical Radio, Inc., which draws the specifications for the equipment, have been convinced for some time now that 3.2 centimeter radar now widely manufactured for military all-purpose uses just would not do the weather surveillance job.

The real clincher came recently from McGill University's Dr. J. S. Marshall, recognized weather authority, in a report titled "The Calculated Sensitivity of Airborne Weather Radar." Working with Dr. Walter Hitschfeld, also of McGill, Marshall documents these findings:

• **Attenuation** by intervening rainfall presents a very serious limitation on the sensitivity of 3.2-cm weather radar. The equipment is rendered practically inoperative by an intervening rainfall of five hundred mmhr/hr-miles, the equivalent of a one inch/hr. rain over a 20-mile range.

• **But with 5.7 cm radar,** although attenuation is appreciable, its sensitivity changes more gradually and the range would never be reduced more than 30%.

The most promising solution seen by Marshall is selection of the 5.7 equipment, concentrating all effort possible in design and construction to keep up the sensitivity. This means plenty of output power and a large antenna.

Here it is interesting to note Marshall's comment on the effect of increasing the intensity of the rain in the target storm. A jump from the 10 mm/hr target rain used in the study to a 60 mm/hr fall (almost always found at the core of thundershowers) will double the range of the radar.

Authoritative Calculation

Marshall's study and report did not come unsolicited. In fact it was sponsored and paid for by the ATA and Arinc. But despite the prior convictions of these groups, a favorable opinion was by no means being "bought." The only request made of Marshall was for an authoritative calculation of the effects of intervening rainfall on radar wavelength, regardless of what his conclusions might be.

The report itself could not have been more timely, for the first commercial airborne weather radar, now being developed by the Radio Corporation of America under contract to United Air Lines, will be 5.7 cm equipment. It will be installed in a UAL DC-3 for a three-month flight evaluation probing thunderstorms in the Denver—Great Plains area and is scheduled to start this June.

With the United-RCA move, airborne radar has really caught on with the airlines. Dr. Marshall's report is a big step toward ironing out one big design decision. Other problems remain however, for the brilliant display tube that the airlines want remains evasive, with most effort directed toward developing the "graded half-tone" by the military. The airlines favor immediate delivery of a "black and white," direct-viewed storage tube and will solicit support from the Air Navigation Development Board.

Another problem concerns the installation of the radar antenna in the nose of the aircraft. Here some real progress is reported on the installation of the 30" antenna in the Lockheed Constellation, but on the Douglas DC-6 things are moving slower.

All in all the horizon is beginning to look brighter for airborne weather radar. When the United-RCA program becomes a thing of the past, the obstacles should be even fewer and the specification can be "wrapped up." The manufacturers are waiting for that day; one is said to have one quarter million dollars ready to invest in whatever radar the airlines want to buy. • • •

Analysis of Slick Shows 'Long Term Growth'

The common stock of Slick Airways is an attractive buy for investors "to whom long term growth is more important than immediate dividend income," according to an analysis of the certificated freight carrier issued by Daniel F. Rice & Co., New York investment firm. The stock now sells for about $8 per share.

It was revealed in the analysis that Slick recently acquired a 40% interest in Dorval Air Transport Ltd., newly-organized Canadian all-cargo carrier.

Two big needs of the air freight industry are improved aircraft and a continuing merchandising effort, the report said, adding that Slick "has demonstrated its ability to accept the challenge. It has a strategic route structure, the most modern fleet in the business, valuable know-how and most important of all, a young and aggressive management."

For the first six months of 1952, Slick's net profit before taxes was $269,000, as compared with $381,076 in the same 1951 period, and indications are that common carrier services for the year about broke even, it stated.

Slick's total borrowings for new equipment will not exceed $3.2 million, the analysis said. The company had six DC-6A's on order, representing a $7.5 million investment.

FLYING ARGUMENTS for delta, straight, and swept wings: Convair's research model, the XF-92; Lockheed's F-94; Hawker's P 1067.

Hottest Fight in Design Today: Wing Shapes

Basic disagreements split industry as manufacturers back chosen theories with men and money.

By WALTER A. KILRAIN

THE HOTTEST pitched battle over basic principles of aircraft design that has been seen since the monoplane-vs-biplane fight was resolved is raging in the aviation industry today. The big names in manufacturing, poles apart in their positions, are betting their futures on the shape of wings to come.

Convair's XF2Y-1, new Navy water-based fighter, looks like an arrowhead on skis; Republic's F-84F has a wing that looks as though it might have started to fold back against the fuselage; the Handley Page HP-80 shows two crescents curved against the direction of flight; Lockheed's F-94 flies on a wing that is straight, razor thin, and tapers sharply toward the tips.

Industry opinion on the various wing shapes is, it is safe to say, divided:

• **For the crescent wing:** "Because of it we can claim to fly fastest, farthest and highest with greatest economy."—R. S. Stafford, chief designer, Handley Page Ltd.

• **For the delta wing:** "The delta offers the best possibility of achieving supersonic speeds with a given power plant."—K. E. Van Every, chief, aerodynamics section, Douglas Aircraft Co., El Segundo division.

• **For the swept wing:** "The swept configurations offer the best possibility of achieving supersonic speeds with a given power plant."—L. P. Greene, chief aerodynamicist, North American Aviation.

• **For the straight wing:** "The thin straight wing . . . can be rated 7 to 10 percent better than either the delta or swept wing."—Hall L. Hibbard, vice president of engineering, Lockheed Aircraft Corp.

Although statements like those above are common, the quotations are over-simplifications, for almost all the arguments for and against the various planforms are hedged about with qualifications, stipulations, and, on occasion, charts. Such bystanders as the men who will buy the planes have to grope their way through the resulting fog as best they can. As Lockheed's chief engineer, Clarence L. Johnson, put it: "While there is a lot of confusion in our own ranks, look how we're confusing the generals!"

Delta Wings

Out of the verbal murk the delta wing has emerged as perhaps the most striking variation from the traditional shapes. Consolidated Vultee, with such delta designs as the XF2Y-1, the F-102, and a closely related bomber in the works, finds the delta a winner hands down. The reasons:

• **Less drag** at transonic and supersonic speeds;

• **Greater stability** than conventional designs;

• **Greater maneuverability;**

• **Absence of buffeting** when crossing sonic barrier;

• **Simpler manufacturing** due to simplicity of tail-less design;

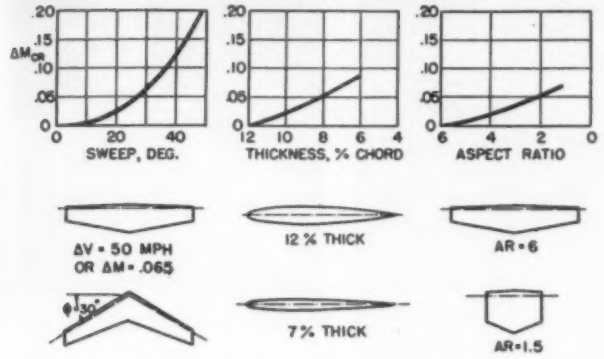
• **Increased lift** and more space for fuel, due to larger wing area.

The drag is cut by three factors in the delta design: sweepback, low aspect ratio (i.e., a rather short, stubby wing), and an airfoil thickness that is relatively small compared with the chord (distance from the wing's leading edge to trailing edge). Of these factors, Convair feels that the thinness of the delta airfoil is the most important, and asserts that for a given thickness (in terms of per cent

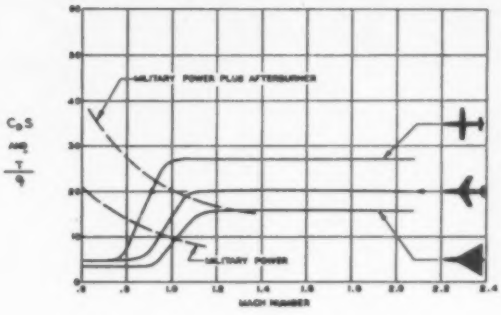
Douglas Looks 'Em Over

The only comprehensive study of the assorted wing shapes that has been made public thus far has come from K. E. Van Every, chief of the aerodynamics section at Douglas Aircraft's El Segundo division. In a paper titled "An Engineering Comparison Using Straight, Swept and Delta Wings" Van Every gave the delta wing the edge in the race, but took pains to observe that the speed spectrum has room for all planforms, and any designer may turn out to be correct if he chooses his wing with the required performance of his particular aircraft in mind.

From a mass of detailed considerations (see accompanying charts) Van Every concluded: "For certain types of aircraft that must reach extremely high Mach numbers, a thin-straight-wing airplane configuration may be the most suitable. For slightly lower Mach numbers in short-range missions, a delta-type configuration may offer the most promise; and for the case where the supersonic Mach number is limited to 1.5 or less and long range is desired, a conventional swept-back-wing arrangement may be chosen."



SPEED AT WHICH DRAG RISES SHARPLY, called critical Mach number, can be increased by three methods shown above in graph by Van Every of Douglas. Sweepback, thin airfoil, and low aspect ratio all work to the delta wing's advantage.



PROMISE OF THE DELTA as the "only" supersonic design is backed by Van Every's graph showing thrust available and thrust required at 35,000 feet. Delta reaches speed of Mach 1.3 before power needs exceed available thrust.

of chord) the delta is both more rigid and considerably lighter than a straight wing, and is even further ahead of a swept wing.

This is not an unqualified advantage, however, since the maximum lift of a delta is less per unit of area than that of other wings. As a result the wing must be bigger, so its total weight may turn out to be no less than that of other designs. There is some advantage in that the increased size of the wing offers a convenient location for fuel tanks and equipment.

The same factors in wing design that reduce drag also tend to make a delta more stable as it crosses into the sonic region, Convair is convinced. Sweepback and low thickness, with large control surface area, also work together to eliminate the problem of loss of control and reversal of controls at high speeds. The buffeting that besets planes with tails when flown at high speeds is reportedly avoided by the delta, partly because of the thin, swept-back wing and partly because the tail, which is subjected to the heaviest loads in other designs, is not there to be buffeted.

Convair has drawn its conclusions from what, in this new field, is a relatively long period of experimentation. Pioneer of the delta was Dr. Alexander M. Lippisch, whose studies on the subject in Germany led in 1931 to the flight of a powered delta glider with the relatively small sweepback of 20° (the P13, also known as the DM-1).

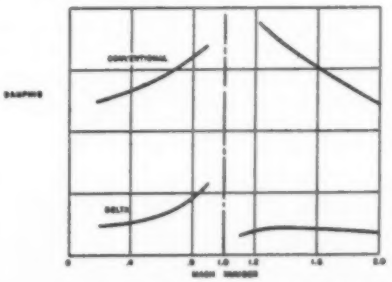
Lippisch had gone directly to flying models and gliders to test his theories, in order to save money and time that would otherwise have been taken by relatively slow wind-tunnel methods. After his successful demonstrations of the P13, which was powered by a pusher propeller, he found the short-cut had disadvantages.

"The test flights of this Delta 1 model showed a clear superiority in performance, compared with the aircraft at this time," Lippisch writes now, "but the prejudice against the all-wing aircraft could not be overcome because these performance figures could not be reproduced in wind tunnel tests." The differences in size between the man-carrying glider and the wind-tunnel models, Lippisch explains, produced the discrepancies, which were not sufficiently allowed for in the theoretical calculations.

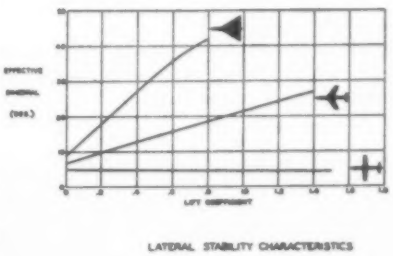
Despite the delta's cool reception, interest in high-speed aircraft soon began to pick up, and the swept wing came into favor. One model Lippisch worked on was far enough advanced in Germany by 1941 to reach a speed of 625 miles per hour with rocket propulsion. At this speed, Lippisch realized, a more highly swept wing was needed; but such wings, although they performed well at high speeds, suffered from what could be disastrous wing-tip stalling at low speeds (a tendency for the wing to tilt suddenly downward due to air spoiling the flow across the end of the wing after having traveled outward along the length of it).

The delta seemed to be the only answer, and a glider designed to test the transonic design was under construction when the war in Europe ended. Lippisch and the glider both came to this country, where he is now the chief of the aeronautical research laboratory for the

DELTA'S DRAWBACKS include two kinds of instability. As most aircraft cross the boundary of the speed of sound their longitudinal stability shows an increase and if displaced from a normal attitude they tend to return to it even more than at other speeds. Tailless designs, however, like the delta, become more unstable in this region, according to Van Every's chart at the left. At low speeds the delta runs into trouble again (see chart at right), since as its lift coefficient rises its effective dihedral rises sharply too. Thus if one wing tilts downward there is a tendency for the aircraft to return to its original position with an undesirable amount of force. Straight-wing aircraft are spared this effect, since their effective dihedral remains constant. A mechanical "yaw damper" can be used to work against the delta's various forms of instability, but use of such "gimmicks" is one of the points scored against the delta by North American's chief aerodynamicist, L. P. Greene.



DAMPING CHARACTERISTICS VS. MACH NO.



LATERAL STABILITY CHARACTERISTICS

FINAL INSTALLATION of new G-E thermocouple assembly on jet engine comes after ten manufacturing steps.

What makes a great jet engine . . .

New G-E "Swaged" Thermocouple Assemblies Last Longer, Require Less Maintenance

G.E.'s new "swaged" magnesia thermocouple systems for averaging exhaust gas temperatures in jet engines, now offer longer operating life, less maintenance, and light weight.

- A complete G-E harness and thermocouple assembly weighs only 25 ounces—considerably less than most other systems designed for the same job.
- In actual flight tests, the G-E thermocouple system, ***without any maintenance,*** outlasted the operating life of the engine.
- Each thermocouple is installed by tightening a single lock nut to a boss. In replacing the harness, it is not necessary to remove clamps, or to unbraze joints.

What makes a great jet engine? The answer is quality component parts. Ask your nearest G-E Apparatus Sales Office for bulletin GEC-915, a descriptive booklet covering thermocouples, harnesses, and leads. If you wish, write *Section 210-71, General Electric Company, Schenectady 5, N. Y.*

You can put your confidence in—

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1. **MAGNESIUM OXIDE** is poured into thermocouples before ends are tamped and closed.

2. **"SWAGING" PROCESS** compacts magnesium oxide powder into a hard, solid electric insulator that withstands severe buffeting.

3. **WELDING PROCESS** joins chromel-alumel junction. It is this part of thermocouple which senses jet engine exhaust temperature.

4. **X-RAYS OF EACH THERMOCOUPLE** are taken from two angles to insure against weak spots that could cause short circuits.

Collins Radio Co.

At about this time the Air Force gave Convair a contract to develop a high-performance interceptor. After conferences with Lippisch and studies of NACA reports, the delta was chosen. A wind tunnel model turned in performance that convinced the USAF that Convair was on the right track.

First flight came in September, 1948; since then more than 100 flights have been made. One of the military pilots who flew the aircraft (designated the XF-92) was Maj. Charles E. ("Chuck") Yeager, who has since asserted that the delta "can out-turn practically any airplane at any altitude," and is next to being stall-proof.

Swept Wings

The first point under fire is the definition. All wings are swept, in the opinion of North American's chief aerodynamicist, L. P. Greene: the "straight" wing is usually swept back along the leading edge and forward along the trailing edge; the "delta" may be swept back 60° along the leading edge and zero degrees along the trailing edge. No matter what the degree or kind of sweep, says Greene, they are all the same breed of cat.

With this proviso out of the way, Greene cites the advantages of medium-aspect-ratio (as distinguished from delta) swept wings:

- **Greater maneuverability** and
- **Better altitude performance,** both due to a smaller drag increase with lift, which in turn results in less loss of speed during maneuvers. On the delta such loss of speed is made worse not only by the low aspect ratio but also by the high trim drag of the tail-less design.

Another point in favor of the "moderately" swept wing is that it does not depend upon "gimmicks, such as pitch and yaw dampers."

Greene's last word on the subject: "Transonic handling characteristics and the maneuverability at high lift coefficients are serious considerations tending to maintain swept configurations, of moderate aspect ratio, as the most promising."

Straight Wings

Almost the sole defender of straight wings these days is Lockheed, which refers to keep the details of its thinking under wraps, avowedly because of security limitations. Its F-104 is expected to show a straight wing and to be designed for sustained supersonic flight.

Backing Lockheed in this stand is the ex-president of Northrop Aircraft, John K. Northrop, now consultant to the Garrett Corp., who is on record with the flat claim that above Mach 2 "sweep becomes ineffective." At lower

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Air evacuation of wounded men from front lines to rear area hospitals is possible today with the development of the Chase Assault Transport.

Casualties no longer risk wound complication or loss of life because of delayed evacuation, as modern techniques, made possible by the Chase C-123 Transport, move casualties directly from combat zones to base area hospitals. No other plane is built to take the brutal punishment of these hazardous front line assignments.

Combat infantrymen, quickly recognizing its unique value, dubbed it "Operation Lifesaver."

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speeds, Northrop declares, the effective length of the wing panel in bending is increased by the sweep-back, thus making necessary heavier construction at the wing root, for a given thickness of wing. If this beefing up is to be avoided, the thickness of the whole wing must be increased, and up goes the drag as a result, the same drag that the sweep-back had eliminated.

"The use of wing sweep," concludes Northrop, "is drag reduction at a price. In some cases the price is worth paying; in others it is not."

Crescent Wings

The crescent is a compromise with the need for a highly swept wing, a high-aspect-ratio wing, and a wing with good stalling characteristics. The wing begins near the fuselage highly swept, picking up the advantages of this factor in the design; out near the wing tips, however, the angle of sweep is reduced, though the high aspect ratio is maintained for good performance at high speeds and altitudes. The Handley Page HP 80, the only version of this design now flying, thus has its performance cake and eats it too.

Advantages of the crescent, according to Handley Page's chief designer, R. S. Stafford, include the fact that since the main wing structure is set well forward on the airplane there is plenty of unobstructed room left for a bomb bay, landing gear, and engines buried in the fuselage. Since the main structure is set ahead of the fire zone, the dangers from fire are also lessened.

Disadvantages include some increase in the weight and complexity of the wing.

Conclusion: Many Things

Probably the most reasonable conclusion to be drawn from these often contradictory theories is that Van Every of Douglas is right: the supersonic aircraft is not a single thing but many different things.

You might classify the types according to size. Is it to be a particularly large airplane, an intercontinental bomber, perhaps? Then the delta wing, despite its many desirable characteristics, may turn out to have too much area, too much skin, too much weight—in short, too much wing. Better a sweptback.

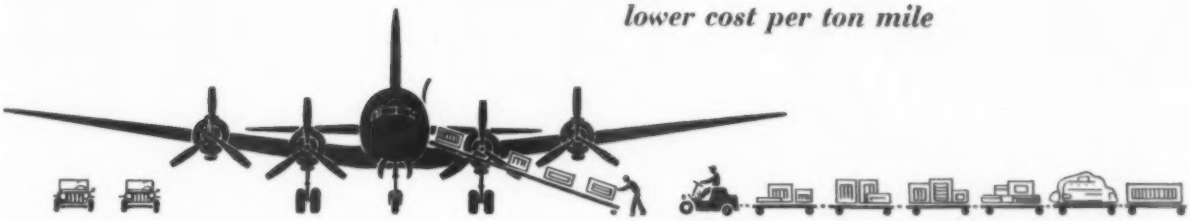
Is it to fly at Mach 1; or Mach 1.2; or Mach 1.4? Then at the lower speeds a sweep of some reasonable extent may be enough to postpone your compressibility troubles beyond the range in which you expect to be operating. At the higher speeds, however, sweep-back may merely serve to push such compressibility effects upward away from Mach 1 and closer to your desired operating speed.

Here there is a basis for Lockheed's

5,000 cubic feet of cargo space...

300 m.p.h. cruising speed...

lower cost per ton mile



___the Douglas Liftmaster

Flying for the Air Force as C-118A and for the Navy as R6D, the Douglas Liftmaster delivers 14-ton payloads 2850 miles non-stop—at the lowest cost.

Outside, Liftmaster shows the same aerodynamic lines as its commercial counterpart, the DC-6A. Inside, there's room for 28,700 pounds of mixed freight. Large front and rear doors service cargo compartments. A self-powered loading elevator lifts 4,000 pounds from truck bed height to cabin floor level . . . fits either door. Through this combination of speed and utility, Liftmaster achieves the ultimate in long-range, low-cost transportation of military matériel.

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The results of man's vast creative energies will be displayed in a magnificent setting at Dayton's Municipal Airport. It will embrace personal and commercial craft, engines, instruments, accessories, safety devices, equipment and developments of like nature—along with Army, Navy, Marine and U. S. Air Force planes, helicopters, navigation equipment, safety devices, radar and exhibits of air research projects and educational developments.

This show will pay a fitting tribute to the Wright brothers on the Fiftieth Anniversary of Powered Flight. It will provide a common meeting place for the nation's air-minded public and all components of private, commercial and military aviation. It will be produced on a scale never before attempted.

For floor plan diagrams, exhibit space contracts, ticket information and complete details write—Benjamin T. Franklin, General Manager, **NATIONAL AIRCRAFT SHOW, 400 Union Commerce Bldg., Cleveland 14, Ohio.**

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close-mouthed confidence in the straight wing: although its peak drag is highest of any wing shape at the speed of sound, by Mach 1.6 it has fallen off to the point where it is less than any swept wing except one with a 70° sweep. It has passed through its time of troubles and is benefiting from its second wind.

In the problems that the delta and swept wings face at landing speeds there is an argument for seaplanes, and particularly for such hydro-ski deltas as Convair's XF2Y-1. With the long "runways" and gradual braking that water landings offer, such planes could afford to make their landing approaches at speeds where they still enjoyed a fair amount of stability.

Meanwhile, while the engineers exchange graphs and the papers are read to the technical societies, the manufacturers are building. Behind the screen of security restrictions and competitive secrecy the builders are staking profits and reputations on the outcome of the industry's great debate. • • •

Willis Reported for ACC Liaison Post

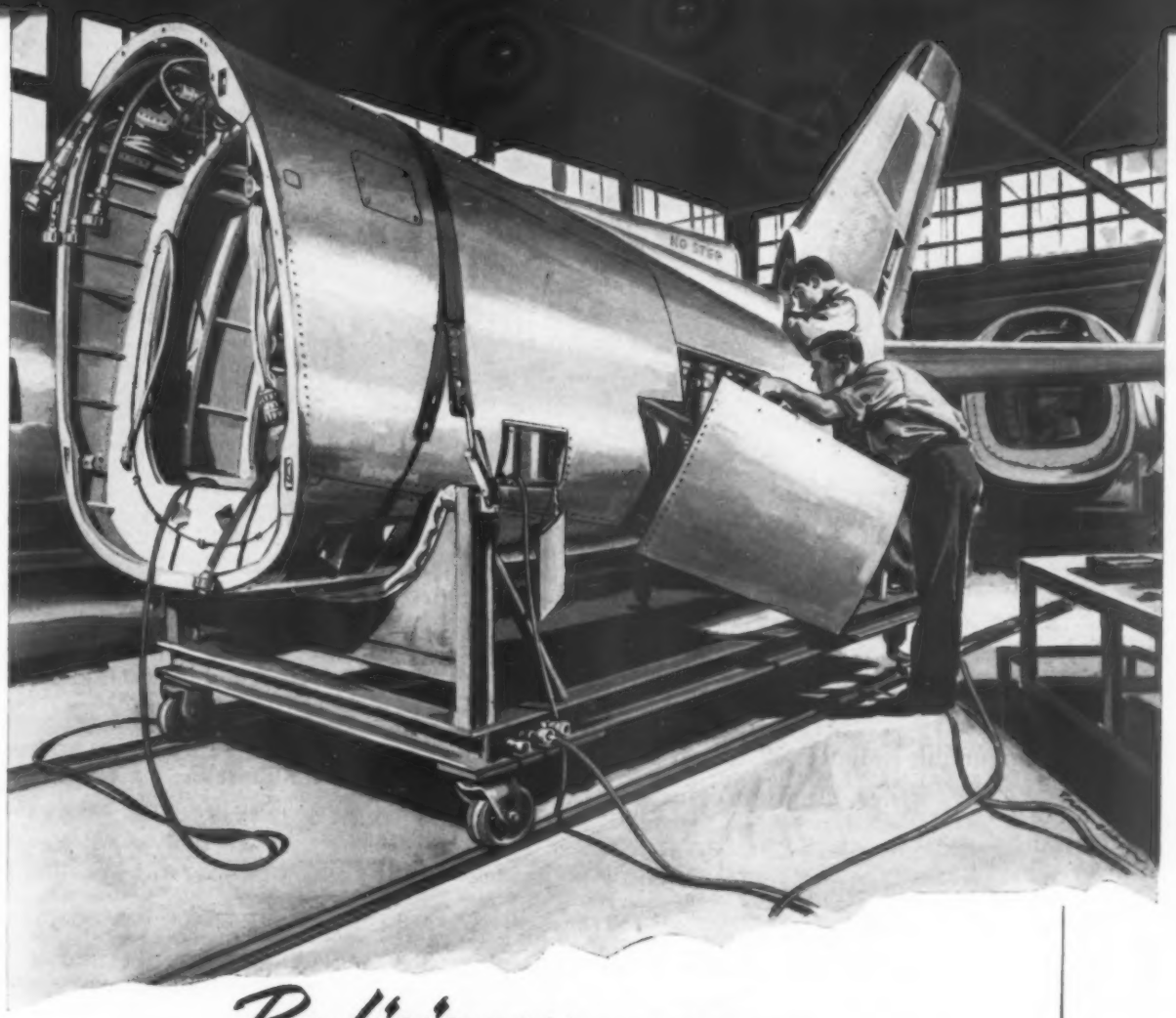
Charles F. Willis, White House staff member, is reported to have taken over duties as liaison officer between White House and Air Coordinating Committee. There may be no formal announcement of his designation.

Current members of the Air Coordinating Committee, as designated by the various government agencies since the change of administration, are as follows: Robert B. Murray, Jr., Under Secretary of Commerce for Transportation, chairman; J. Paul Barringer, director of the State Department's office of transport and communications policy; Earl D. Johnson, Under Secretary of the Army; John F. Floberg, Assistant Secretary of the Navy for Air; H. Chapman Rose, Assistant Secretary of the Treasury; John C. Allen, Assistant Postmaster General; Oswald Ryan, CAB Chairman; J. Weldon Jones, Bureau of the Budget's economic adviser (non-voting); Col. Alvin B. Barber, National Security Resources Board (non-voting).

The Air Force has not yet designated its member. There is also no ACC vice chairman at present.

French Get Contract

A $1,500,000 overhaul contract has been awarded France's SFERMA company, a subsidiary of SNCA du Sud-Quest, for the overhaul of USAF Douglas C-47's in Europe. The engines will be overhauled by Air France.



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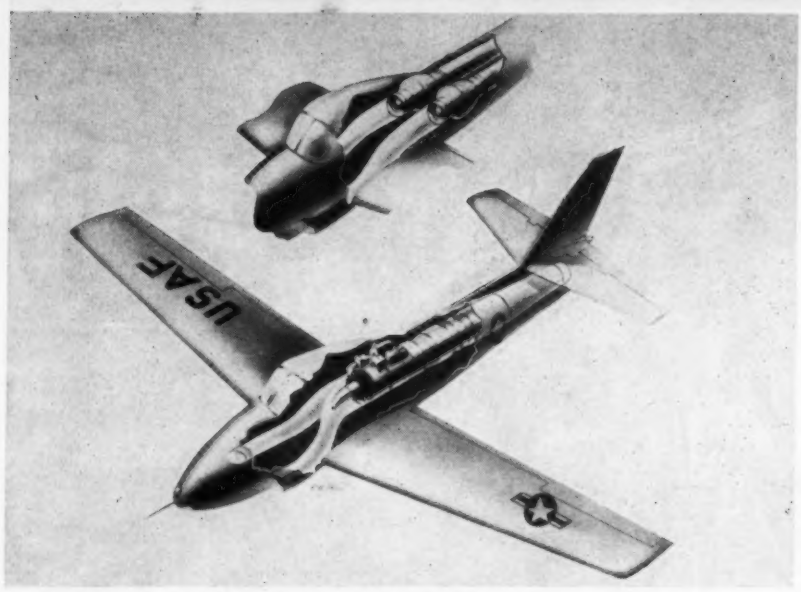

CONVERTIBLE jet trainer can serve dual role as single- or twin-engine plane.

Ryan May Still Be in Jet Trainer Race

Convertible Model 59 could use either one or two jets; AF may order, despite Cessna contract.

By JAMES J. HAGGERTY, JR.
An AMERICAN AVIATION *Exclusive*

ALTHOUGH the Air Force's recent controversial jet trainer competition was won by Cessna Aircraft Co. with a twin-Marbore design, there is a chance that Ryan Aeronautical Co. may yet receive a contract for its interesting new "convertible," the Model 59. This design can be built for use with either one or two engines. If the Air Force can find the money, it might well give Ryan a contract as "insurance," since it indicated at the start of the competition that two development projects might be pursued.

The number of engines was an important point in the trainer competition. When the competition was announced the aircraft manufacturers interested contacted officials of Air Training Command and found that the predominant sentiment was in favor of a single-engine airplane, since it was not considered good policy to start off a new cadet in a twin-engine airplane.

There was one problem, however: the power requirements for the performance demanded were such that there were no engines available which could handle the assignment with a single installation. Allison Division of General Motors had a proposal—use the power section of a T-38 turboprop engine. Converted to a pure jet it could develop 1,870 pounds thrust, just about right for trainer performance. But the Allison proposal, known as Model 520-Cl, had not been developed. On the other hand, there was available an engine in a lower thrust category (the Turbomeca Marbore, built in the U.S. by Continental Motors, developing 880 pounds thrust) which could provide the required power in a dual installation.

Novel Idea

While other companies were pondering whether to submit a single or twin-engine design, Ryan hit upon a novel idea: design an "envelope" which could handle either installation. If the USAF decided to go ahead with a conversion program on the Allison 520-C1, the Ryan design would be ready for it. If, on the other hand, the USAF decided that time could be saved by using the Marbore installation, Ryan's envelope could handle that, too.

There was also the possibility that, after trying the twin-engine design, the USAF might find it too complicated for flight trainees and decide to revert to the single-engine plane. Ryan's Model 59 could be switched from twin-engine to single-engine at any point in the production line without modification.

The only difference between the single- and dual-engine designs of the Model 59 is the actual power plant installation. In either case, air intakes are located at either side of the fuselage aft of the leading edge of the wing. The jet exhaust exists from the rear of the fuselage.

This has an advantage in the case of the twin-engine design. With individual exhausts, should one engine go dead there would be an adverse yaw effect on the airplane. But in the Model 59 the thrust line is centered, and the only effect would be loss of power. A cockpit-controlled butterfly valve in each entry duct allows the closing of the entry when one engine becomes inoperative, thus reducing internal drag losses.

The flexibility of the engine arrangement was obtained by locating all the fuel in the wings. With a normal fuel load, the Model 59 has an endurance of 2.9 hours at 35,000 feet. This can be increased to 5.16 hours by the addition of fixed wing-tip tanks of 100 gallons capacity each.

Performance of the Model 59 is roughly the same with either the twin-Marbore or the single Model 520-C1 installation, as shown by the following.

	Two Marbore 351 Engines	One Model 520-C1
Cruise speed, 35,000 feet	286 knots TAS	286 knots TAS
Maximum speed, sea level	356 knots TAS	359 knots TAS
Maximum speed, 35,000 feet	371 knots TAS	371 knots TAS
Service ceiling normal power	*above 35,000 feet	40,500 feet
Initial rate of climb, sea level, full military power	3,410 ft. per. min.	3,120 ft. per. min.

* Engine manufacturer's power curves do not extend beyond 35,000 feet.

Ryan, incidentally, has already had considerable experience with the Marbore engine, which carries the USAF designation J69. It is the powerplant in an alternate version of the Ryan XQ-2 target drone.

Other statistics of the Model 59:

	Allison 520-C1	Turbomeca-Continental J-69
Span	38.4 feet	same
Length	28.5 feet	same
Height (tail)	10.9 feet	same
Wing area	210 square feet	same
Empty weight	3,699 lbs.	3,621 lbs.
Useful load	2,291 lbs.	2,375 lbs.
Gross weight	5,991 lbs.	5,996 lbs.

Seniority Suit Ends

A lawsuit springing from a senority list came to an end in Alexandria, Va., as a Federal District Court threw out the case that an Allegheny Airlines pilot had brought against ALPA and Allegheny (formerly All-American). The pilot had charged the union and the airline with discrimination; case was dismissed for failure to prove the claim.

LOOKING OVER DME UNIT are (left to right) Ora W. Young, CAA's First Region Administrator; Remington Taylor, Mohawk superintendent of communications; and R. P. Sherwood, assistant to the vice president-operations.

Mohawk Awarded DME Test Contract

Controversial navigation aid gets first operational try-out under novel ANDB contract.

UNDER an arrangement without precedent in the development of new navigational facilities, Mohawk Airlines will soon become the first airline to have its entire fleet of airplanes equipped with Distance Measuring Equipment (DME), the Air Navigation Development Board has announced. The local service airline and ANDB have negotiated a contract for operational testing of the advanced navigational aid by Mohawk's pilots over the next 12 months, at a cost to ANDB of only $9,000.

The program is set to get under way soon. Several airplanes are equipped and the others will follow in a short time. The contract signed by Mohawk requires that the airline:

- **Install Model DIB Hazeltine** DME interrogators being furnished by ANDB in its fleet of nine Douglas DC-3's;
- **Train all pilots** in their use;
- **Use the DME** during routine operation. Pilots will record all data obtained; company technicians will analyze it and prepare a comprehensive report to ANDB, to include a summary of all errors detected.
- **Return the equipment** to ANDB when the test ends.

In use DME gives the pilot a visual indication of the distance from the airplane to the ground facility. The airborne interrogator sends out a series of pulses to a ground received, which triggers a ground transmitter and returns a signal to the airplane. The airborne equipment then measures the elapsed time of the cycle in millionths of a second and converts the answer into a direct reading of the slant distance from the plane to the ground station.

Closely watching the test along with ANDB will be the Civil Aeronautics Administration. CAA will speed up the schedule for installation of DME ground transponders at Buffalo, Rochester, Syracuse, Elmira, Albany, Binghamton, and Watertown, N. Y., and at Boston and Gardner, Mass. Ground stations at Poughkeepsie, N. Y., Caldwell, N. J., Wilton, Conn., and Allentown, Pa., are ready for use.

The operational test stands to serve as a valuable forerunner for wide-scale use of DME. Some 24 ground stations throughout the U. S. have now been set up in CAA's program, which calls for 426 installations through 1953.

Pressure Control Unit

A new cabin pressure controller mounted on the pilot's instrument panel and weighing three pounds is now in production by AiResearch Manufacturing Co. It combines a cabin pressure selector, rate of change selector, and a differential pressure control.

Cutaway Drawing Reveals F-84F Details

First cutaway drawing of a Republic Aviation jet fighter-bomber, that of the F-84F Thunderstreak, is shown on the following pages. Unlike the F-84 Thunderjet series, the F-84F has swept wings and uses a 7,200-pound-thrust J65 engine, compared with Allison J35's (more than 5,000 pounds thrust) in the straight-wing models. The Thunderstreak will be the USAF's successor to the F-84, of which more than 4,000 have been delivered for U. S. and NATO use.

The reconnaissance version, the RF-84F, will have the air inlet moved to the wing roots to make room for camera equipment, but production F-84F's will have it in the nose, much like the F-84. Other differences between the Thunderjet and Thunderstreak include a changed pilot canopy, relocation of the dive brakes, and elimination of wing slats. Latter were included in the Thunderstreak prototype but will be left out of production models.

New Control Plan For Defense Materials

A new Defense Materials System designed to replace the Controlled Materials Plan for allocation of scarce metals will go into effect after June 30, according to Acting Defense Mobilizer Arthur S. Flemming.

DMS will continue priority symbols for defense producers, including builders of military aircraft, and it is probable that the old A-1 aircraft rating will be continued for producers of commercial transports because of their usefulness in any future mobilization. No decision has yet been made on similar priorities for companies which make civilian lightplanes and helicopters.

Flemming said that while CMP, which went into effect July 1, 1951, will end after June, allocations of nickel stainless steel, widely used in jet engine and other plane production, will continue for both civilian and military users. Other scarce materials such as nickel, molybdenum, and tungsten will probably also remain under control.

Fokker in Brazil

Fokker Aircraft Co. and the Brazilian government have entered an agreement whereby the Dutch company will set up a Brazilian subsidiary to build planes at the government-owned plant at Galeao airport in Rio de Janiero. The aircraft will probably be Fokker's trainers, the S-11, S-12, S-13 and possibly even the jet S-14.

THE F-84F THUNDERSTREAK

(1) GUN DECK INSTALLATION
(2) IN-FLIGHT REFUELING INSTALLATION
(3) TAIL EJECTOR ASSEMBLY
(4) SPEED BRAKE DOOR
(5) SHROUD COOLING DUCT
(6) TURTLEDECK COCKPIT ENCLOSURE
(7) CANOPY COCKPIT ENCLOSURE
(8) CANOPY ACTUATION ARM ASSEMBLY
(9) PILOTS JETTISON SEAT ASSEMBLY
(10) WINDSHIELD ASSEMBLY
(11) AIR INTAKE DIVIDER
(12) LANDING GEAR ACTUATING CYLINDER
(13) FORGED FRONT SPAR
(14) FORGED REAR SPAR
(15) PROTECTIVE SHROUD ASSEMBLY
(16) VENTRAL FIN ASSEMBLY
(17) JET EXHAUST OPENING
(18) NOSE BEAM ASSEMBLY

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The following excerpts are from a speech delivered by Senator Symington earlier this month and entitled "The Truth May Keep Us Free."

Symington Sounds Off

STUART SYMINGTON, elected Missouri's Democratic junior senator during last November's election, served as first Secretary of the Air Force from 1947 to 1950, for a year and a half prior to that being Assistant Secretary of War for Air. He later held the post of chairman of the National Security Resources Board.

FOR a long time, both before and after the start of the Korean war, we followed the advice of those Pentagon people who glibly explained to the National Security Council why America could not afford adequate rearmament.

The Government accepted this price tag on security, rejecting the advice of a few Congressional leaders and others who pleaded that a balanced budget would mean nothing if it resulted in a slave state.

Certain fiscal leaders, who should have been talking about fiscal affairs, suddenly became military experts; and advanced the cause of one type of jet engine over another.

Certain scientists, who should have stuck to science, desired to enter politics; so they wrote vague, misleading books on military strategy; and became so-called experts on the organization of the Department of Defense.

In other words, too many people were minding other people's business, to the detriment of sound decisions in their own areas of responsibility.

This led to confusion, and therefore compromise, and therefore military weakness. . . .

Now the Administration has changed. But one thing has not changed. The policy of butter and guns has not shifted in favor of guns. The balanced budget is still around the corner. But so also is the most dangerous enemy free men have ever known.

I do not believe this policy is right. . . .

Some say we are spending on national defense as much as we can afford. But no cost is too high if it is necessary to maintain freedom. Yet it is nonsensical to spend ourselves into bankruptcy because of a wastefully inefficient defense organization.

There is a saying in business that an organization can stand outside competition, but can't stand inside competition. A firm will ultimately fall apart when its executives are at cross purposes with one another.

The Department of Defense is suffering from inside competition, and the American people are suffering because of it. If the Pentagon operated under a unification law which gave efficient business and military administration, with less service friction, we'd get far more defense for far less money. . . .

At the same time we provide [the Russians] with a military university for the instruction of their technicians, at no loss to them except some equipment and a few pilots.

At very little cost to the Russians, we are teaching them how to defeat us if they decide to expand the Korean war into World War III.

Rather than coming up with the truth to the people, we follow the tragic steps of certain World War II allies, by again attempting to purchase a nervous neutrality.

In this air atomic age . . . the opening battle may well decide the war.

Stalin is now dead. This is unlikely to affect the world favorably, because Communists believe fanatically that they must bring all men under their bloodstained banner. In my opinion, they will not deviate from their purpose unless they are checkmated.

Fortunately for us, we do not stand alone against Soviet Russia. We have staunch allies. But America is the final bulwark of the free world. What we do, or fail to do, will determine the fate of all men everywhere.

In summary, are we, the American people, satisfied with the way the international picture is shaping up?

If not, what should we do?

The people must know what they ought to do.

In an effort to help with that decision, the Government should now publish answers to such questions as:

How many men under arms did the United States and its allies have at the end of World War II—and how many did the Soviets have?

How many men under arms do the United Nations have today—and how many is it estimated the Soviets have? . . .

How many long range bombers, capable of striking the United States, is it estimated the Soviets have today? How many long range bombers, capable of striking Russia, has the United Nations?

How many jet bombers has the Soviet? How many has the United Nations?

How many modern jet fighters for defense against Russian atomic bombers has the United Nations? How many modern jet fighters is it estimated the Soviet have for defense against our retaliating bombers?

What is the 1952 estimate of modern Soviet jet fighter production? What is the estimate for 1953?

What are the comparable United Nations modern jet fighter production figures for 1952 and 1953?

What is the estimated comparable jet bomber production of Russia and the United Nations for the two years in question?

Aren't we supposed to match the Kremlin's quantity of manpower with our quality of horsepower instead of trading man for man with the Communist hordes? Therefore why don't we use the atomic bomb on military targets in North Korea?

Now we come to the three most important questions of all—the answers to which may well foretell whether or not we are to remain a free people. These questions are:

What is our Government's estimate of that date when the Soviets may have what they might consider enough atomic weapons to launch a successful attack, by air and submarine, against the United States?

Is our Defense Department properly organized for the most efficient utilization of the taxpayer's dollar in building a defense, against such an attack, by that date?

And is the size and form of our defense program aimed toward the maximum national defense possible against atomic attack by that date?

In other words, will we be ready when that critical day comes?

The answer in my opinion is "no"—and I believe the facts prove it.

In any case, why not give the facts to the people?

If that were done the people themselves would demand a wholesale reorganization of our Defense Department, so as to get more defense for less money.

This position is not to be construed as a criticism of the Administration. For years a few of us have tried to get the truth of our military position out to the people, because we believe our national security, far from preventing the publication of this information, rather demands it.

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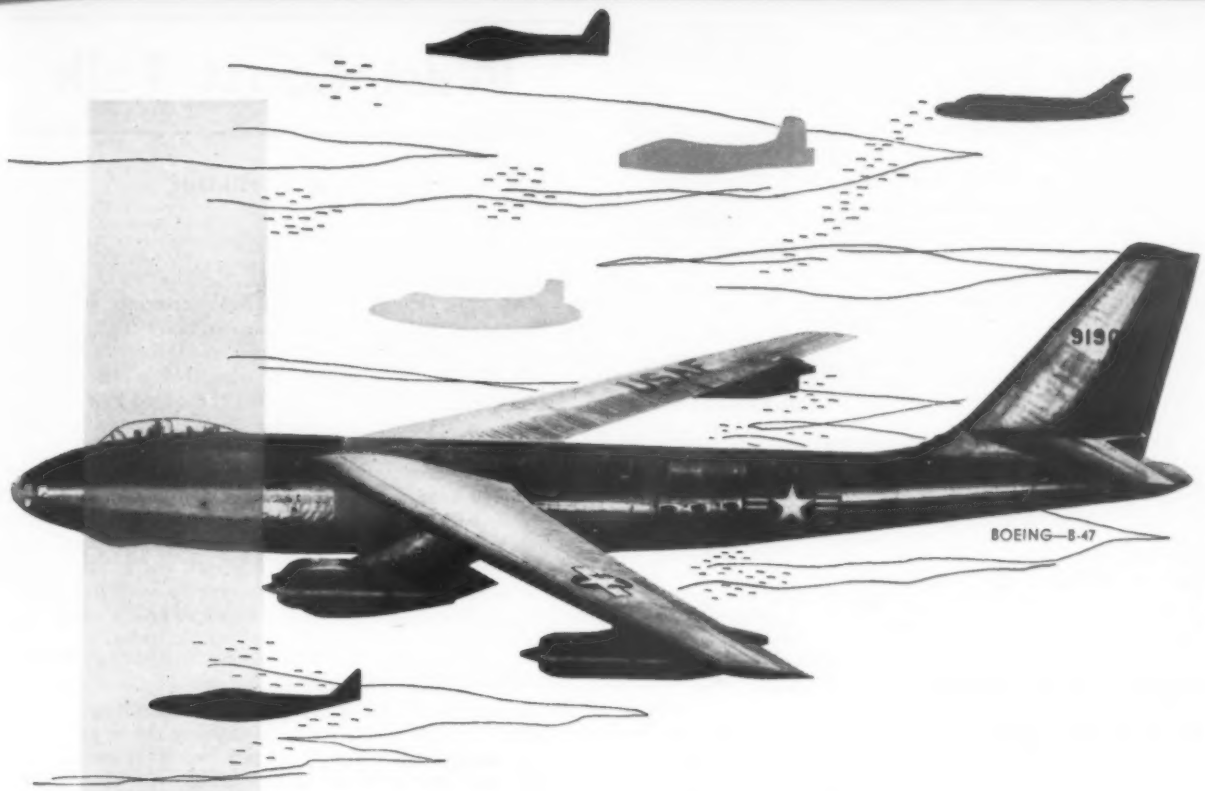

STOP COCKPIT FOG

When aircraft fly under high humidity conditions, air leaving the air conditioning system often becomes super-saturated. Immediate fogging and condensation on cool surfaces such as the canopy glass and instruments results. Since this undesirable condition is most likely to occur at low level it constitutes a severe flight hazard, particularly during a landing or take-off.

By removing 80 per cent of the entrained moisture, Stratos Air-Moisture Separators stop cockpit fogging and eliminate the hazard. They are small and light. Completely self contained, they are installed in the cabin air duct line downstream of the cooling unit. No source of power other than the flowing air is needed. First installation of these centrifugal separators is being made by Boeing—whose engineers established the design requirements and did the original research — in the B-47 "Stratojet".

AIR MOISTURE SEPARATOR

Model MS60 • Rated Flow 64 #/min.
Weight 5.5 lbs Duct Dia 4"

OTHER MODELS

MS20 • Rated Flow 20 #/min.
Weight 3 lbs Duct Dia 2.5"
MS35 • Rated Flow 40 #/min.
Weight 4 lbs Duct Dia 3"

STRATOS

A DIVISION OF FAIRCHILD ENGINE & AIRPLANE CORPORATION

Main Office and Plant: Bay Shore, Long Island, N. Y.
West Coast Office: 1355 Westwood Blvd., Los Angeles 24, Calif.

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OTHER STRATOS PRODUCTS

Air-Turbine Drives • Cabin Superchargers • Air Cycle Refrigeration Equipment
Air Moisture Separators • Mass Flow Valves • Emergency Disconnects

Utility Aircraft Schedules Climb

Utility aircraft production will continue to rise in 1953, after 1952's record civilian output.

Estimated production schedules for the four major lightplane manufacturers in 1953 call for the completion of more than 3,790 aircraft, compared to the 2,987 shipped by the four companies in 1952. Schedules for 1953 are as follows: Cessna, more than 1,800 planes; Beech, 490, including 340 Bonanzas, 50 D-18's, and 100 Twin Bonanzas; Piper, over 1,400; and Aero Design, 100.

Piper also has worked out a tentative schedule for its new Twin Piper, although no orders will be taken until after the flight model is completed in June. The first two production models are expected to be ready in August and by February, 1954, 50 will have been completed. Piper hopes for a two-a-day schedule by May, 1954.

Japanese to Build Bell Helicopter

Japanese license production of the Bell 47D1 helicopter by Kawasaki Machine Works Company, Kobe, will start shortly. The license deal was handled through the intermediary of Nippon Kikai Boeki, Tokyo trading company, which represents Bell Aircraft Co. in Japan. The sales price of the Japanese-built helicopters will be about $22,700, half the cost of U.S.-manufactured Bell models with shipping charges to Japan. Substantial Japanese government orders are expected for the license-built Bell 47D1's as part of a general program designed to help the Japanese aircraft industry get on its feet and equip the embryo air force and naval air service.

PHOTO CREDITS

13, 14—United Air Lines
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35—C. H. Smith
38—USAF
41—Barber-Colman
51—Dept. of Defense
58—British European Airways
68—Brady

West Coast Talk

By Fred S. Hunter

NORTH American Aviation's export department is focusing on the T-28B, the Navy version, in mapping plans to push export sales of the trainer. Reason is production on the T-28B carries on at Downey after the Air Force T-28A phases out this summer. It's also a better plane, which doesn't cost much more. The Navy trainer is powered by a Wright R-1820-86 engine as compared to the Wright R-1300-1 in the T-28A, and it also has a three-bladed prop. The added power boosts the T-28B's speed to 343 mph, as compared to 283 for the T-28A, and increases rate of climb from 1,870 to 3,540 feet per minute.

If the T-28 comes within a country mile of the popularity of the famed AT-6 Texan series in the foreign field, all will be peaches and cream in NAA's export section. NAA hopes it will turn out that way because its off-the-shelf business in T-6G's (remanufactured AT-6's) finally has come to an end. The AT-6 surplus well has dried up. Here and there individual planes are available, but prices have been going up to where they are not worth buying to work over. Only continuing T-6G export activity comes from countries which have AT-6's and send them in for the re-work. A recent order of this type came from Ecuador.

OVER-SIZE SPAR MILL

Pride of the machine shop Douglas El Segundo is installing at its new Torrance, Calif., works will be a spar mill running the length of the shop and having approximately 320 feet of mill bed. This more-than-a-block-long giant will have provision for 16 bridge-type heads. For the present, however, Douglas has ordered only eight. Setup on the machine will be in the heads. They'll travel full length of the machine and each head will be controlled independently.

J. D. Thomas, manufacturing superintendent at Torrance, envisions such flexibility of operation as two heads traveling over a spar cap while another follows making the scarfing cut. With the present typical equipment located at the El Segundo plant, most caps have to be run through three or four mills. With the big mill at Torrance the job can become one operation by making the heads do the work. The mill is being built to Douglas design specifications by Farnham. Douglas doesn't say how much it will cost, but it probably approaches a million dollars.

EMPLOYES' GIFT TO MANAGEMENT

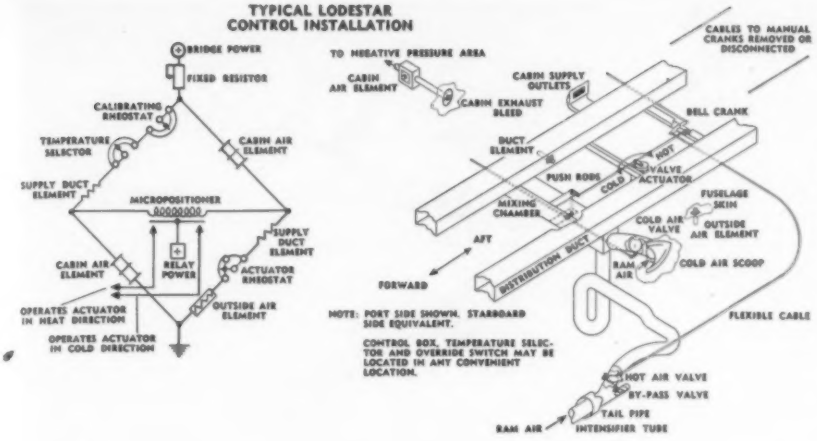
When workers at the Talley Machine & Manufacturing Corp. in Los Angeles presented the company with an American flag, flag pole, and fittings the other day, Maj. Gen. William M. Morgan, chief of the Western Air Procurement District, was so impressed he accepted an invitation to be the speaker at the flag-raising ceremonies, and made a talk on "Labor and Management Working Together."

Talley is in the Small Defense Plant category, with about 150 workers engaged on aircraft components. Company has sub-contracts with Convair, Douglas, Lockheed, North American, AiResearch, Rohr, Solar, and Aerojet. Its shipments, according to President Frank Talley, range between $1,500 and $1,800 per month per district worker, which is considerably above average production volume.

The company has a pay bonus plan based on volume of production and individual worker output. It also is getting high equipment utilization with two 10-hour shifts.

WEST COAST MISCELLANY

Ryan Aeronautical Co. has learned that four of 12 **Ryan STM-150** training planes delivered in the late 1930's still are being used by the **Guatemalan Air Force** for intermediate training and solo flying prior to advance training in North American AT-6's. . . . Lockheed estimates it **saves money on 32 planes** in machining a slab 40 feet long, 40 inches wide, and 1⅝ inches thick for integral stiffening in the Super Constellation wing. It is trying to get the mills to extrude the material. Meanwhile, it cuts away and **sends the chippings back** to the aluminum company for re-fining. . . . Rohr put its **1,000th Riverside plant employe** on the payroll recently. . . . Example of how business is booming in the aircraft seat business is **TECO's $2,000,000 backlog.** That's about four times what it was a year ago.



Executive Cabin Controls Developed

Barber-Colman is offering two automatic temperature systems for Lodestar and DC-3 heating units.

By Lois C. Philmus

THE BARBER-COLMAN Company has adapted two of its automatic cabin temperature control systems to fill the needs of corporate and executive aircraft owners, operating medium twin-engine equipment. The company estimates that about 30% of this group is currently equipped with one of its two controls and reports claim a cabin temperature regularity within plus or minus two degrees.

• **The automatic heater cycling system** is designed for aircraft with combustion heater installations, as in the A-26, B-23, PV-1, and in certain of the DC-3 family. The Grumman Mallard is factory-equipped with this control.

• **Proportioning mix-valve controls** are recommended for installation in Lockheed Lodestars and those DC-3's which retain the original intensifier tube heating system.

In the case of the DC-3 or C-47, S. D. Reed, of the aircraft controls division, points out that variations of duct work and control linkage configurations are in service, and, in these cases, the operator might do well to appraise his heating problem on an individual basis.

The proportioning type temperature control system automatically positions the hot-cold air mixing valve to conform with desired cabin temperature. Installation eliminates the manual cranks and flexible cable of the right hand cold air valve and the hot air bell crank.

Consisting of seven components weighing about seven pounds, the control system includes a control box containing the Micropositioner, secondary relays, fixed resistors, and calibrating rheostats; temperature selector; cabin air element; supply duct air element; outside air element; mixing valve actuator; and manual override switch, which can be included in the temperature selector.

Non-electronic, the circuit is based around a temperature-sensitive Wheatstone bridge. A polarized relay detects immediate changes in temperature as they occur in the thermostatic elements in the cabin, supply duct, and outside air. One advantage claimed for this system is that the valve actuator only makes a position change when demand varies and it is claimed that no movement occurs under quiet flight conditions.

The cost of the components is about $320, with installation charges varying throughout the country.

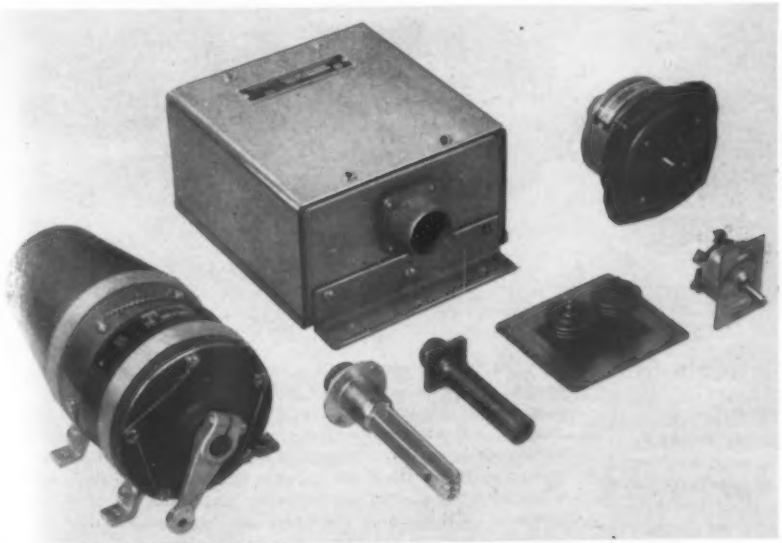
Heater Cycling

The automatic heater cycling system for combustion heaters also operates on the basic Wheatstone bridge control circuit, similar to the mixing valve control, with the exception that the control automatically cycles heater ignition and fuel solenoid instead of positioning the valve actuator.

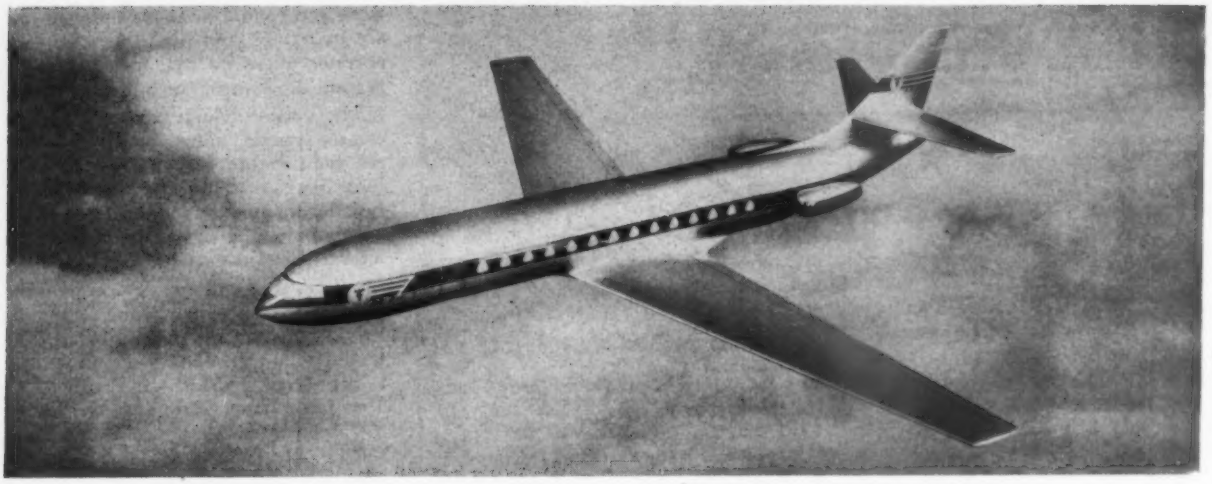
Components consist of a similar control box, as well as temperature selector, cabin air element, heater discharge air element, outside or ram air element, and a high-limit thermostat. Total component weight is 3¾ lbs. and is priced at approximately $150.

In this control, the high-limit thermostat is used to limit the heater discharge temperature during the cabin warmup period. A 350° safety thermostat can be installed, if desired, to signal the pilot in case anything goes out of order; it can be wired to "lockout" circuit until reset.

"A good installation and an efficient aircraft heating and ventilating system," Reed cautions "are prerequisites in obtaining maximum performance of any automatic control system." He also stated that many refinements in the way of associated equipment are optional to the individual owner. • • •



AUTOMATIC CONTROL components for Lodestar installation weigh about seven pounds and include control system, temperature selector cabin air element, supply duct air element, outside air element, mixing valve actuator and manual override switch.



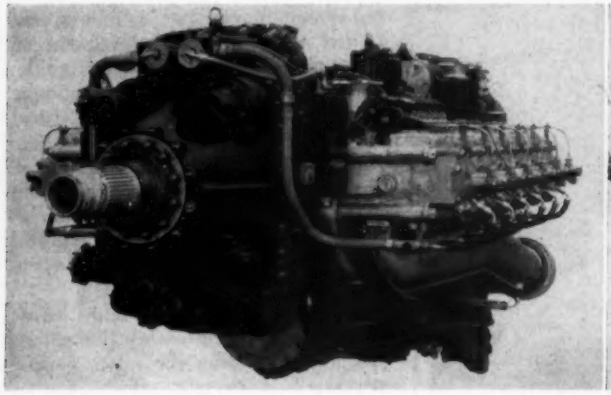
TO BE BUILT JOINTLY by two manufacturers, France's SE 210 is shown in model form.

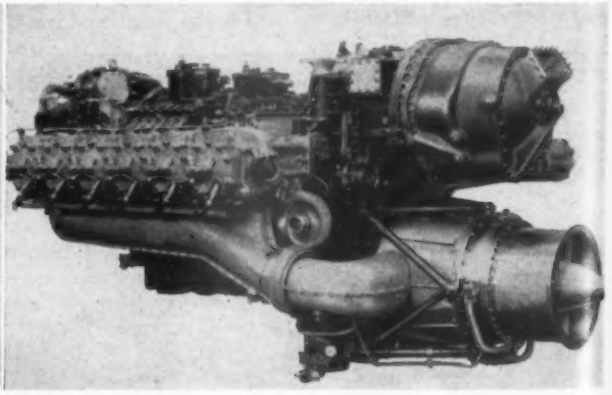
France 'Cuts Tin' for Commercial Jet

Construction of France's first commercial jet transport is under way, Georges Glasser, president of SNCA du Sud-Ouest, told AMERICAN AVIATION during a business visit to the U. S. this month. The jetliner, designated SE 210, is being built jointly by SNCASE and SNCASO and is scheduled to fly early in 1955. Glasser stated that the two companies decided to go ahead with the construction of the prototype without waiting for a formal order from the French government. SNCASE is building the fuselage and will handle the assembly of the aircraft, while SNCASO is constructing the wing structure.

The SE 210 is to be a medium-range aircraft powered by two 9,000-pound static thrust Rolls-Royce Avon RA16 turbojets installed in nacelles at the rear of the fuselage (this is designed to facilitate quick engine changes). Glasser pointed out that this engine is the powerplant of the Comet III and indicated that the SE 210 thus might particularly appeal to operators of the de Havilland jetliner as a complementary aircraft for shorter stages. Air France is extremely interested in the design, he added.

The full characteristics and performance data for the SE 210 have not been officially announced, but the main specs are understood to be as follows: span, 111 ft. 5 in.; length, 111 ft. 8 in.; wing area, 1,528.5 sq. ft.; aspect ratio, seven; wing sweepback, 22½°; gross weight, about 79,000 pounds; payload, about 14,500 pounds (70 passengers); cruising speed, 497 mph. • • •





Latest version of European aviation's first large compound engine, the Napier Nomad, is now being bench tested and will soon start flying trials. It develops 3,135 ehp with a specific fuel consumption of between .33 and .33 lb/ehp/hour over a wide range of altitudes and speeds. The original Nomad was flight tested for 15 months; as a result of experience with this engine the new Nomad is a considerably small and lighter unit—9 ft. 11 in. long (3 ft. 6 in. shorter) and 3,580 pounds in weight (half a ton lighter). Production of the new engine could start at the end of this year if the British government were to give the green light. Like the Wright Turbo-Compound, the Nomad is intended primarily for use in long-range aircraft (it was planned to power military transport and patrol bomber designs).

The Nomad consists of a simple valveless two-stroke diesel engine to which is added a turbine-compressor set. The axial-flow compressor is on a common shaft with a multi-stage exhaust turbine, and the turbine-compressor set thus formed is coupled mechanically to the compression-ignition engine and the surplus power available from the exhaust gas turbine is transmitted to a common, single-rotation propeller shaft by a reduction gear in the nose of the engine assembly. The low fuel consumption (as compared with a gas turbine) is achieved by the use of a high compression ratio and a high expansion ratio made possible by the combination of the diesel engine with a gas turbine. A special feature of the Nomad is that it operates equally efficiently on kerosene, diesel fuel, or wide-cut gasoline.

It's a Matter of Record

Bendix Ignition Analyzers Are Performance Proven by Leaders in Aviation, Industry and by the Military Services

Under Every Operating Condition . . .

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Aerolinee Italiane Internazionali (Alitalia)
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Boeing Airplane Co.
Braniff Airways, Inc.
Bristol-Myers Co.
British Commonwealth Pacific Airlines, Ltd.
California Central Airlines
Canadian Pacific Airlines, Ltd.
Chase Aircraft Co., Inc.
Chevrolet-Aviation Engine
Chicago & Southern Air Lines, Inc.
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. . . In All Parts of the World

Iberia-Spanish Air Lines (Lineas Aereas Espanolas)
Ingersoll Products Div. (Borg Warner Corp.)
Kaiser-Frazer Corp.
K. L. M. Royal Dutch Airlines
Linea Aeropostal Venezolana (LAV)
Lockheed Aircraft Service Int'l., Inc.
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Los Angeles Airways, Inc.
M. Santos, Luanda Angola, East Africa
Mallard Air Service
Nash Motors
National Airlines, Inc.
National Greek Airlines T.A.E.
North American Aviation, Inc.
Northeast Airlines, Inc.
Packard Motor Co.
Pacific Airmotive Corp.
Pioneer Air Lines, Inc.
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Wright Aeronautical Corp.

No more convincing evidence of the all around efficiency and dependability of the Bendix Ignition Analyzer could be submitted than this list of users. Truly—under every operating condition and in all parts of the world—the Bendix Ignition Analyzer is one of the finest investments in improving services and cutting operating costs.

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Bendix

SCINTILLA MAGNETO DIVISION OF SIDNEY, NEW YORK

Bendix AVIATION CORPORATION

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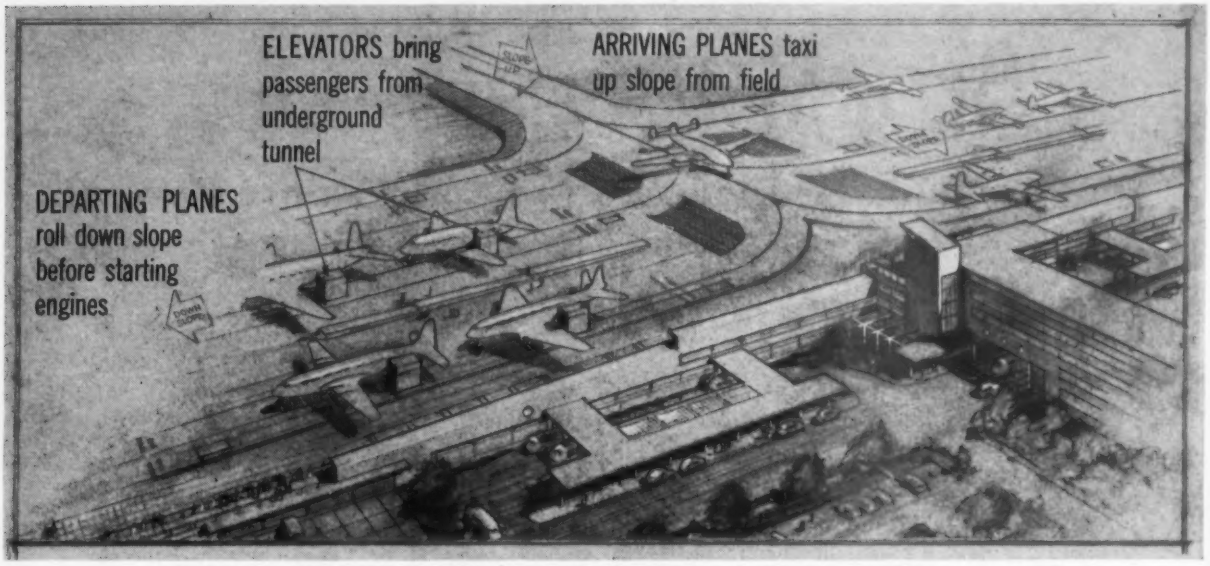
FACTORY BRANCH OFFICES: 117 E. Providencia Avenue, Burbank, California • Stephenson Building, 6560 Cass Avenue, Detroit 2, Michigan
Brouwer Building, 176 W. Wisconsin Avenue, Milwaukee, Wisconsin • 582 Market Street, San Francisco 4, California


ELEVATORS bring passengers from underground tunnel
ARRIVING PLANES taxi up slope from field
DEPARTING PLANES roll down slope before starting engines

AUSTRALIAN TERMINAL designed for turbojet and turboprop operations.

Aussie Jetliners Would Roll, Not Roar

A NEW DESIGN for airport terminal areas has been evolved in Australia, the first country outside Europe where both turbojet and turboprop transports are scheduled to come into regular operation. Designed to mitigate the effect of blast, heat, and noise caused by gas turbine engines, the new concept, it is claimed, offers economy as well as increased safety and a reduction in noise. Australian Civil Aviation Department officials who developed the concept admit that it does not represent the perfect solution to the problem, but suggest that it may prove to be a worthwhile line of development for airport terminal areas in the jet transport age.

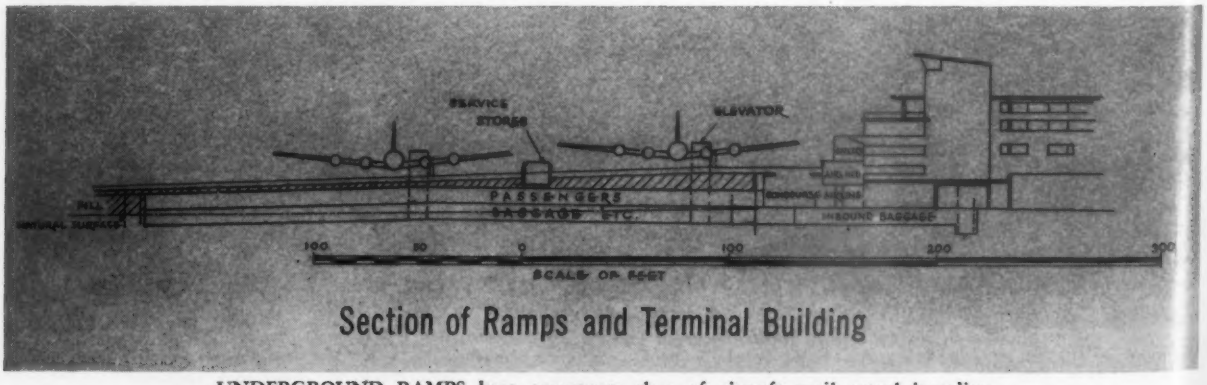
As shown by the accompanying drawings, the aircraft would taxi from the runway up a slope to the loading apron area, which is on a downward slope at the roof level of the terminal building. The engines would then be cut and the plane would roll silently to chocks rising from the ramp. When the aircraft was loaded it would again coast, this time down the ramp to the taxiway, where the engines would be started without danger to persons in the loading area.

Although the idea of controlling a fully loaded aircraft down a curved and relatively narrow slope without the use of the engines might not be thought to appeal to the average pilot, tests involving the coasting of aircraft down slopes of similar width and gradient, with similar curves to those projected, have been completed to the satisfaction of both pilots and airport officials, Australian sources state.

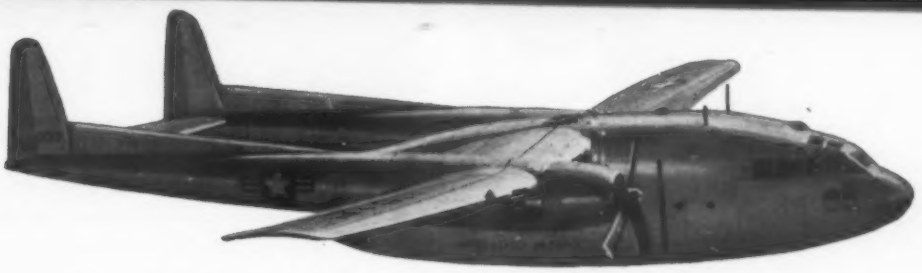
The concept minimizes but does not eliminate the effects of gas turbines. Nevertheless the earthwork ramp in front of the ground floor of the terminal building (which houses the airline offices, passenger lounges, restaurants, and a shopping area), would give substantial protection from engine noise. Access to the aircraft is provided through tunnels under the ramp, with elevators taking passengers and cargo to the sides of the aircraft.

The terminal areas as illustrated are for a relatively small airport. One apron with nine aircraft positions could handle 200 departures and arrivals per day, whereas two aprons with 18 positions could cope with more traffic than an airport with a single runway could provide, the Australian designers claim.

Although the initial cost of each terminal would be at least $600,000, the concept is said to involve low maintenance costs. It will undoubtedly provide food for thought among the airport designers of the world. • • •



UNDERGROUND RAMPS keep passengers clear of aircraft until actual boarding.



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including 17 men and their equipment...

is easily loaded and transported to a combat area in the Fairchild C-119 Flying Boxcar ...and C-119's are doing it day after day!

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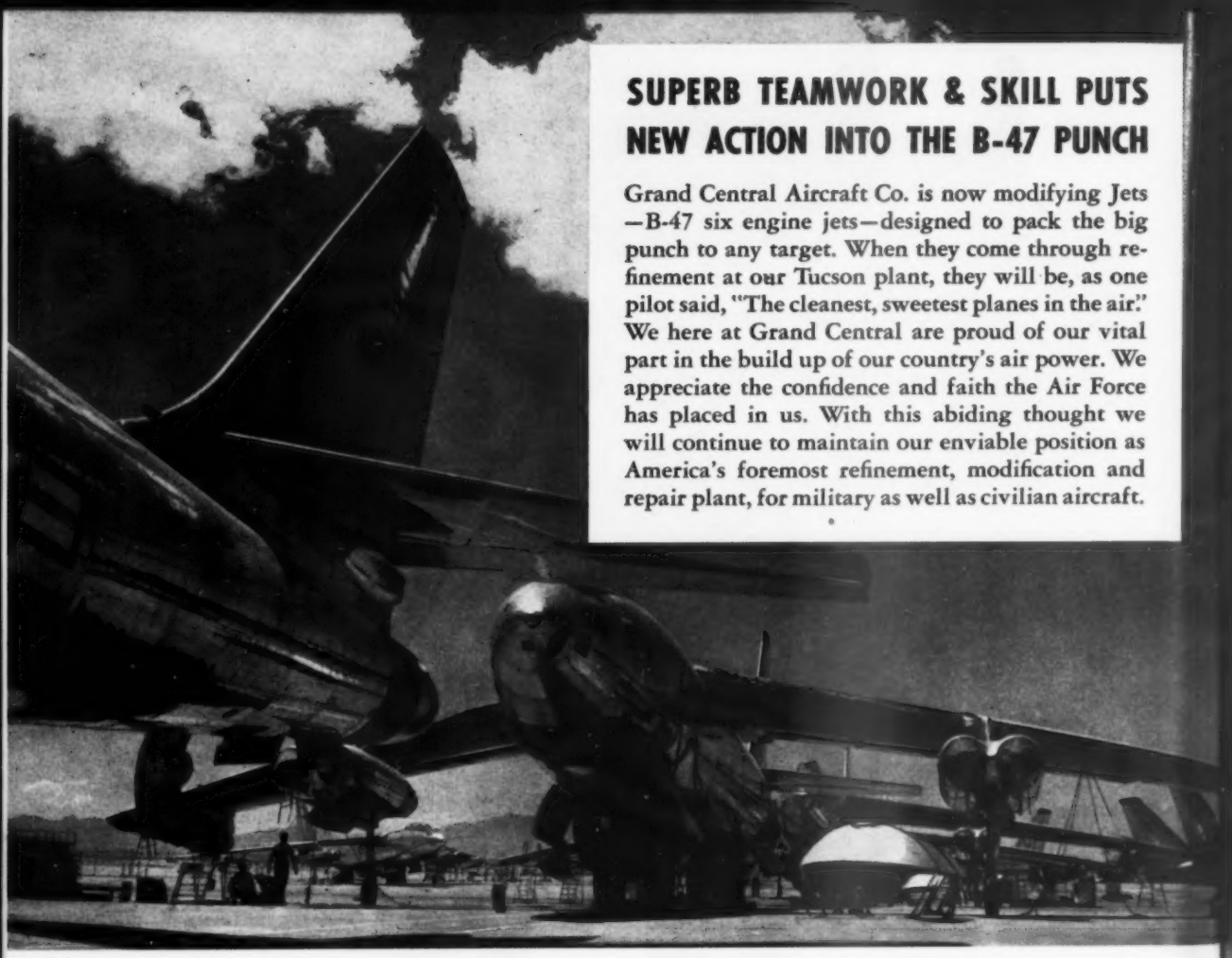
Other Divisions: Guided Missiles Division, Wyandanch, L.I., N.Y. • Engine Division, Farmingdale, N.Y.



SUPERB TEAMWORK & SKILL PUTS NEW ACTION INTO THE B-47 PUNCH

Grand Central Aircraft Co. is now modifying Jets —B-47 six engine jets—designed to pack the big punch to any target. When they come through refinement at our Tucson plant, they will be, as one pilot said, "The cleanest, sweetest planes in the air." We here at Grand Central are proud of our vital part in the build up of our country's air power. We appreciate the confidence and faith the Air Force has placed in us. With this abiding thought we will continue to maintain our enviable position as America's foremost refinement, modification and repair plant, for military as well as civilian aircraft.

SKILLED CRAFTSMEN WANTED

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ualified Aircraft Men of Integrity are invited to write r information regarding positions in our long range B-47 ogram at our Tucson, Arizona plant. We need electronic chnicians, aircraft electricians, radio mechanics, draftsmen d engineers. If you are experienced and like the "Pulling gether" spirit, write today. Full employee benefits, high age scales and excellent opportunities.

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New AiResearch ram air turbine does a 250 pound job for jets... *weighs only 17 pounds!*

At last a *light weight* emergency power source to operate power controls in case of single engine failure! The new AiResearch ram air turbine develops a minimum of 3.4 hp at air speeds from 130 knots to above Mach I... *at any altitude.* It is now in production.

Features:

- Supplies enough power to operate a 3000 p.s.i. hydraulic system.
- Completely self-governed.
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- Occupies less than 3/4 of a cubic foot of space, eliminating previously required cumbersome storage batteries and electric motors.
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This ram air turbine is another example of AiResearch design and production ingenuity in the field of high-altitude, high-speed flight.

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AiResearch Manufacturing Company

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DESIGNER AND MANUFACTURER OF AIRCRAFT EQUIPMENT IN THESE MAJOR CATEGORIES

Air Turbine Refrigeration | Heat Transfer Equipment | Electric Actuators | Gas Turbines | Cabin Superchargers | Pneumatic Power Units | Electronic Controls | Cabin Pressure Controls | Temperature Controls

'COPTER HOVERS over one-man GCA.

'Copter Navigation Study Under Way

The Air Navigation Development Board has announced the details of a helicopter air navigation study which is officially scheduled to get under way soon, and through which the future needs of the helicopter for instrument flight operations will be determined.

Under the supervision of ANDB's Helicopter Navigation Guidance Group, which includes representatives from all of the military services, the Civil Aeronautics Administration, and the Civil Aeronautics Board, the project is divided into two phases:

• **Flight testing** of present navigational instruments and aids for application to large scale helicopter operations.

• **Development of new aids** to suit those needs peculiar to the helicopter, where present facilities are found wanting.

The ANDB study is already under way, although the helicopter to be used —a U.S. Marine Corps Sikorsky HRS-2 —has not yet been specially instrumented. The study began in February when the Marine Corps started an evaluation of a "one-man" GCA unit purchased by ANDB from E. K. Cole, Ltd. of London, England. The shakedown of the Ekco radar by the Marines is serving two ends: evaluation of it for ANDB as a helicopter landing aid, and completion of a military equipment evaluation for all of the U.S. military services.

The broad ANDB program, which is reported to cost about $50,000 and involve from 75-100 hours of flight testing, is expected to last about six months.

Operating from the Marine base at Quantico, the helicopter will test present navigation aids in the area of Herndon and Front Royal in Virginia and Martinsburg, West Va., where distance measuring equipment (DME) ground stations have been set up. Mountainous terrain in the area promises to serve both military and civil needs, closely simulating the operating conditions of Los Angeles Airways in its west coast operation and those of the military in Korea.

Extra Section

By William D. Perreault

ONE of the finest books to come to our attention in recent years is the new volume by **Dr. Ross A. McFarland,** of Harvard: "Human Factors in Air Transportation." This single volume contains more information on all phases of aviation safety, with particular reference to the human element, than all the books we've seen on the subject put together. Such massive works are labors of love, produced for the service they offer to the industry, since they do not sell in sufficient numbers to prove profitable to the author. Published by McGraw-Hill, 330 West 42nd St., New York City, N. Y. Price: $13.

•

Pilot aging, one of the topics discussed at length by McFarland, will be the subject of a study by a committee of the Aero Medical Association. The committee will be appointed by Dr. W. R. Stovall, president of the AMA and CAA's top medical man, prior to the 24th annual meeting of the organization in Los Angeles in May. The study was prompted by former President Truman's Airport Commission which urged a "thorough study of pilot aging and allied problems." While the Dept. of Commerce has primary responsibility for the study, the AMA will handle the project.

•

It's always difficult to realize how rapidly U.S.-built engines are building up operational experience in the jet field. A reminder came from the Aircraft Industries Association last week. AIA noted that jet engines built by one U.S. manufacturer have flown more than 2.25 million hours, equal to more than 1.1 billion miles, and are adding to that total at the rate of more than 100,000 hours per month.

•

It's interesting to record what organization can do for a group. We have been particularly impressed by the case of the Corporation Aircraft Owners' Association and the job **Cole Morrow,** chairman of the board of CAOA, has done for business firms using aircraft. When Morrow took over the direction of CAOA it was largely an ineffective group, little recognized as the voice of any segment of the industry. Morrow has shaped it into an organization which speaks, and speaks effectively, for a very large segment of the active users of business aircraft. This serves a valuable purpose for the entire industry, permitting other segments to weigh corporate user requirements on a sound basis.

•

I take this opportunity to apologize to The Institute of the Aeronautical Sciences. In this space last issue I criticized the Institute's action in cancelling Ben Howard's paper on air safety as "an ostrich-like attitude." This was not justifiable. The paper was cancelled because New York, where the paper was to have been presented, is super-sensitive to matters of aviation safety since the Elizabeth incidents. It would have been asking for trouble to present a paper as dramatic and straightforward as was Howard's in New York at this time. The industry would have suffered. IAS was right in its action.

•

An easy way of developing an inferiority complex is to start talking jet aircraft and engine data with some of the nation's youngsters. Final proof of this could be had talking with **Harry J. Cassidy, Jr.,** of Painted Post, New York, one of the forty successful contestants in Westinghouse Electric Corp.'s Science Talent Search. Cassidy, 18 years old, was picked from some 3,000 general entries in the contest for the design and construction of a jet engine built from scrap. Cassidy used heavy gage stovepipe for the compressor housing; compressor rings and blades were made from tops and botoms of tin cans, etc. The engine operates and produces thrust. The Westinghouse Educational Foundation awards prizes, ranging from $2,800 downward, to the final winners.

Maintenance Bulletin Board

Spare Parts Kit Marks Engine Troubles

One of the better yardsticks for judging the types of mechanical difficulties to be expected from a particular type of airplane lies in the make-up of the spare parts kit used when an airplane is engaged in frequent off-line operations where normal stock is not available.

The predominance of engine malfunctions is testified to by one such kit, used by an airline with over seven years of experience operating Douglas DC-4 equipment with Pratt & Whitney R-2000-13 engines. Aside from the usual hardware it includes:

- **An engine starter,** starter relay, and three starter current limiters;
- **A magneto,** six ignition lead cigarettes, and a high tension lead;
- **A set** of spark plugs;
- **A front and rear** ignition lead conduit and elbow;
- **A propeller governor,** pulley, and cable.

Interchange Gaskets

Cabin pressure regulator valve gaskets on Martin 4-0-4 aircraft and those on Lockheed Constellations are very similar. Trans World Airlines recently adopted an employe suggestion that the Lockheed gaskets be used on the Martin airplanes. It seems the LAC gasket fits the 4-0-4 installation perfectly—and cost one-tenth the price of the Martin gasket.

Wrench Speeds Brake Drum Change

Time was when a brake drum change on a Douglas C-124 added up to one big job: three men took about five hours to complete the change. The 1,000 pound wheel was held by two men while a third changed the brake drum, using an ordinary socket wrench.

The inefficiency of this operation didn't appeal at all to Ralph Nugent, civilian employe and hydraulic shop foreman at Westover Air Force Base, headquarters of the Military Air Transport Service, Atlantic division. Nugent went to work and designed a speed wrench with a simple spring and clip attachment which holds the nut whether the wheel stands still or rotates. Today the brake drum change is a one man job which takes only one hour—a net saving 14 man-hours.

Daily Utilization

Domestic Carriers

Average Revenue Hours of Use per Day per Aircraft for all Types of Service

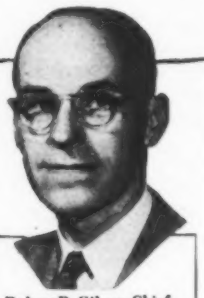
	November	December
American	7:29	7:42
Braniff	7:04	6:41
Capital	7:32	7.29
Caribair	4:00	4:00
C & S	9:24	8:58
Colonial	6:40	7:07
Continental	6:27	6:25
Delta	8:23	8:13
Eastern	8:00	7:37
Hawaiian	4:48	5:17
National	8:18	8:18
Northeast	6:21	4:14
Northwest	8:14	8:20
Trans Pacific	6:06	6:10
TWA	5:28	5:36
United	6:31	6:23
Western	7:52	7:51

NOTE: Above figures include utilization of aircraft in both scheduled and non-scheduled services.

SPEED WRENCH now used at MATS Westover AFB saves 14 man-hours in Globemaster brake drum change, is demonstrated by its designer, Ralph Nugent, civilian employe and hydraulic shop foreman at Westover AFB (See story above).

Engineers

AN INVITATION TO YOU TO GO PLACES WITH FAIRCHILD



Robert D. Gilson, Chief of Structures. Has worked on many top aviation projects in the aircraft industry, specializing in structural problems.

A secure future, exceptional opportunities for advancement, and a high starting salary await you at FAIRCHILD. We have openings right now for qualified engineers and designers in all phases of aircraft manufacturing.

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At 12:15 he learned about a sales opportunity—400 miles away.

At 2:45 he's on the spot via his company-owned Beechcraft Bonanza ready to do business.

You may say this is an unusual man, using unique methods. Just the opposite. Thousands of executives use Beechcrafts daily in just such fashion. They profit from anytime mobility of action, cut travel-time as much as 75 per cent, are away from their desks *less*, see their families *more*. For typical costs and operating data, call your Beechcraft distributor or write:

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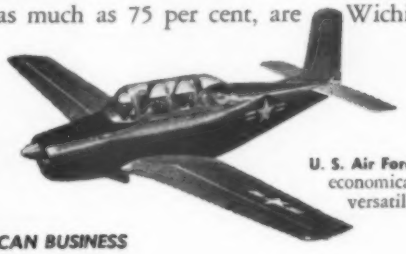
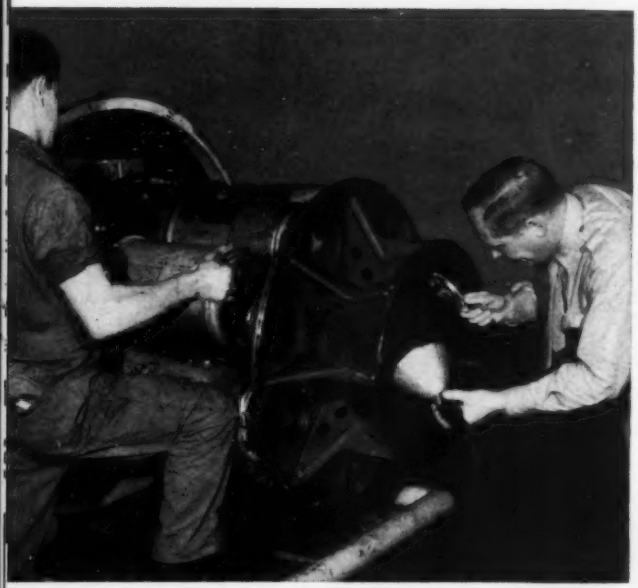


U. S. Air Force T-34A is the world's most economical military trainer. Adaptation of the versatile, reliable Beechcraft Bonanza.

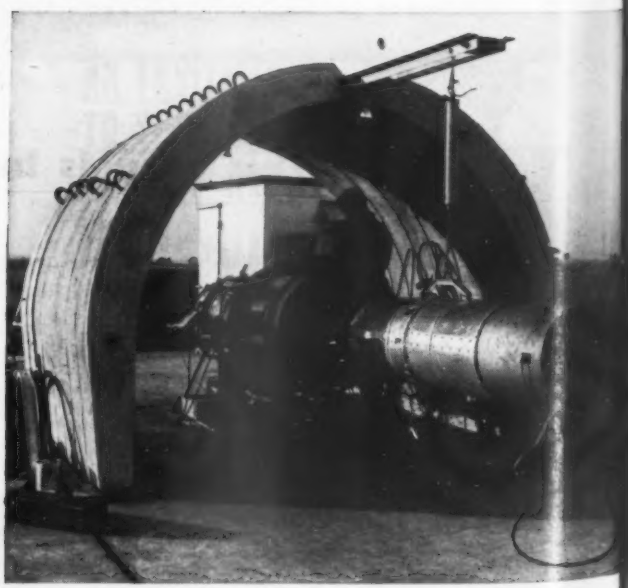
BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

KOREA—G-E service engineer and North American Aviation field engineer inspect General Electric J47 at Air Force base in Korea. G-E tech reps maintain close contact with engines in the field, provide technical assistance, and perform a variety of trouble shooting jobs.

WORLD-WIDE JET SERVICE

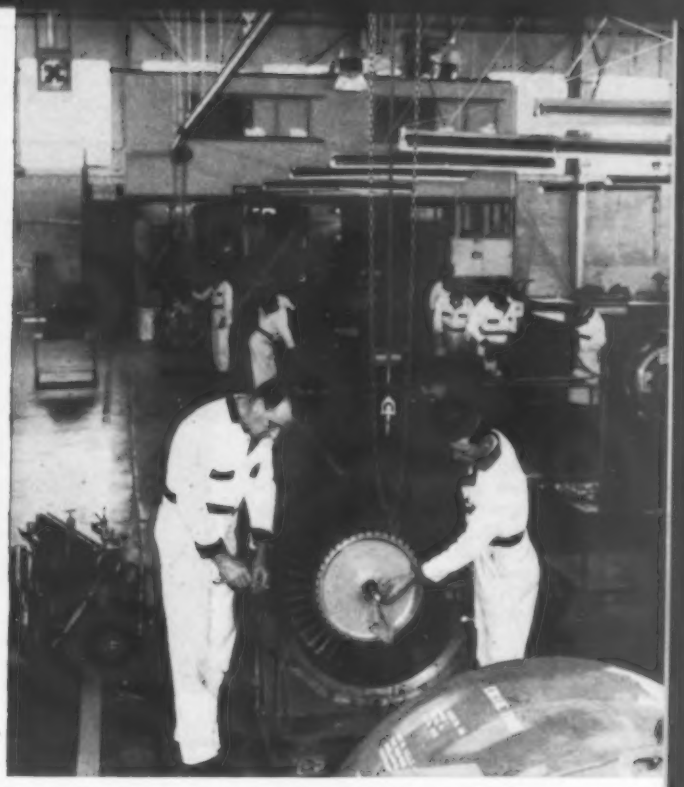


ENGLAND—First of G.E.'s overseas service outposts for turbojets, England is today the service center for G-E engines in NATO aircraft.



JAPAN—Test stand for turbojets at Johnson Air Force Base, Japan, is one of many installations where G-E service is available.

LOS ANGELES—Completely equipped General Electric modification shop services G-E turbojets on West Coast. Above, technician makes a micrometer measurement of compressor rotor shaft.



STROTHER FIELD—Former Air Force base has been converted into modern General Electric shop for G-E turbojets and has facilities to handle any type of engine modification.

E ENGINEERING...

Assures Optimum Performance At All Times For G-E Turbojets

ANYWHERE IN THE WORLD a G-E turbojet is in use, a representative of General Electric's world-wide service organization is on the spot to assure peak engine performance. Highly trained technical representatives assist and supervise servicing of G-E jet engines regardless of where the engines may be. This close contact in the field also allows the technical representatives to keep factory engineers informed of engine performance in the field.

OVERSEAS, G.E.'s technical representatives are active in Korea, England, Germany, Puerto Rico, and Alaska. More service outposts will be set up as needed—not only for military jets, but for commercial jets as well.

STATESIDE SERVICE to G-E turbojets goes on at two completely equipped modification shops at Los Angeles and Strother Field, Kansas. Technical representatives at 65 locations . . . USAF bases and other key operational centers . . . complete a coast-to-coast service network that brings G-E engineering within easy reach of G-E jet engine users.

COMBAT ENGINES, along with some from U.S. bases, are now being shipped back in limited quantities to G.E.'s Evendale, Ohio jet center, near Cincinnati. There a section of the plant is currently gearing up to overhaul veteran engines and put them back on the flight line. General Electric Company, Schenectady 5, New York. 230-9

CINCINNATI—Overhaul of combat and stateside engines within G.E.'s Evendale, Ohio jet center lets design engineers study veteran engines first hand.

You can put your confidence in—

GENERAL ELECTRIC

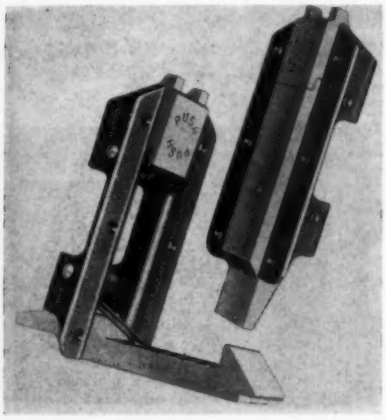
New Products

Resistance Bulbs

Increased service life by simplified construction is the theme behind a new line of hermetically sealed electrical resistance bulbs now in production by Thomas A. Edison, Inc.

The units, which are built to conform to current MIL specifications, include these changes: a single deep-draw tube replaces the well which formerly had a silver soldered end cap; the hex head and connector housing assembly is combined into one machined part, eliminating several machining operations and assembly; and a glass-to-metal seal replaces the former ceramic bushing and washers and permits use of a hydraulic press to provide a hermetic seal between the housing and element assembly.

Address: **Thomas A. Edison, Inc.,** Instrument Division, West Orange, N. J.



Flush Latch

A new channel flush latch, designated part number H-5200 and built specially for application to all types of modern aircraft, has been introduced by the Hartwell Aviation Supply Company.

Fabricated from 24ST aluminum extrusions, the trigger-action latch mechanism features aerodynamic flushness and high strength, the use of extrusions permitting a very small radius of exposed edges which is not possible with punch press parts.

Bracket construction is standard 302 stainless steel sheet stock and installation cut-out is made in the form of a simple rectangular slot. Latch is mounted by fastening the bracket with six rivets to the door structure.

Address: **Hartwell Aviation Supply Company,** 9035 Venice Boulevard, Los Angeles 34, Calif.

AUTOMATIC FLIGHT PLAN is punched into tape by special coding device built for Honeywell by Remington Rand, Inc. MH secretary, M. J. Houser, shows how it is done.

FLIGHT PLAN IS INSERTED in Automatic Master Sequence Selector by Hugo Schuck, Honeywell aeronautical research director, shown with R. Michel and K. Bulleyment, research engineers.

Sequence Selector for Automatic Flight

The Minneapolis-Honeywell Regulator Company and the U.S. Air Force have jointly announced the development of an electrical "brain" called the Automatic Master Sequence Selector (AMSS) which enables an aircraft to take off, fly on a preset course to a chosen destination, and land, all without the aid of a human pilot. An engineering prototype of the device has been delivered to the USAF and is awaiting flight test by the Air Research and Development Command, Wright Air Development Center, Dayton, Ohio.

Termed the next major step in automatic flight beyond the USAF Douglas C-54 Atlantic crossing in 1947, the new Minneapolis-Honeywell control is centered in a pre-punched, piano-roll type of flight plan which divides the entire flight into sequences and serves as the brain of the AMSS.

Assuming the airplane is lined up with the runway for take-off, the first sequence sets the autopilot to follow the runway beam and adjusts the power control for take off. As the plane reaches take-off speed, a sensor in the airspeed system signals the automatic selector, where the take-off attitude is set through the autopilot vertical control. When the landing gear leaves the runway and the shock struts extend, another signal to the AMSS raises the gear and sets a predetermined rate of climb; then the lateral control is turned over to the magnetic compass to follow a given heading.

En route, the control is maintained by radio beams from navigational aids. Changes in altitude or heading en route can be made at "way points" where ground radio beams are fed into a navigation computer, which relays the instruction to the autopilot.

Nearing its destination, the airplane is controlled into position to use automatic approach and landing systems, is let down, and is braked to a stop on the runway.

Mechanically the predetermined flight plan is prepared on a special coding device built by Remington Rand, Inc., for Minneapolis-Honeywell. When fed into the Automatic Master Sequence Selector much like a piano roll, some 430 metal pins within the sensing element drop down on its surface, searching out the punched holes. As each pin drops into a hole, an electrical contact is made; this, in turn, is converted into a signal to the airplane's controls.

The automatic control resembles in size and shape a large table-model television set. Within its housing are some 1,000 parts, and several miles of electrical wiring. As a measure of its intricate design, some 800 electrical outlets are used to connect it with associated controls throughout the aircraft.

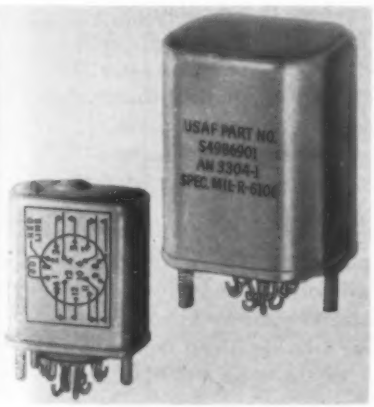
Address: **Minneapolis-Honeywell Regulator Company,** 2600 Ridgway Road, Minneaplois 13, Minnesota.

Relief Valve

A fuel vent relief valve which safeguards fuel tanks against possible collapse or over-pressurization, in use on the North American F-86D and Navy FJ2, has been developed by the J. C. Carter Company. Available in several models, the No. 5058 fuel vent relief valve and the No. 5059 fuel vent and dive relief valve are both normally open.

In operation, when the solenoid is energized the pressure relief valve closes, but is free to re-open at a pre-determined pressure, even though the solenoid remains energized. Advantages of the "normally-open" design of the valve include: an open vent line during ground operation for pressure fueling; sufficient clearance so that there is no possibility of icing around the seat; fail-safe performance in the event of electrical failure in flight.

Address: J. C. Carter Company, Pasadena, Calif.



Sealed Relay

A hermetically sealed relay described as the equivalent of AN 3304-1 units but 50% smaller and lighter has been placed on the market by the R-B-M Division, Essex Wire Corporation. Called the series 2[illegible]0 relays, the new units include a re-[illegible] armature design which, with a high temperature molded nylon bobbin is said to provide improved magnetic efficiency permitting the overall reduction in size and weight. Relays are available in AN 3[illegible] type enclosures for dynamotor or low capacitance applications.

Address: R-B-M Division, Essex Wire Corporation, Logansport, Indiana.

DESIGNED FOR THE RCAF, Avro's new all-weather, long-range fighter is shown here during its first test flight. The CF-100 is the first modern fighter plane to be entirely engineered and built in Canada. *Photos by A. V. Roe Canada Ltd.*

AVRO's New CF-100 Greer-Tested

Famous A. V. Roe Canada Ltd. counts on Greer dependability for quality control equipment

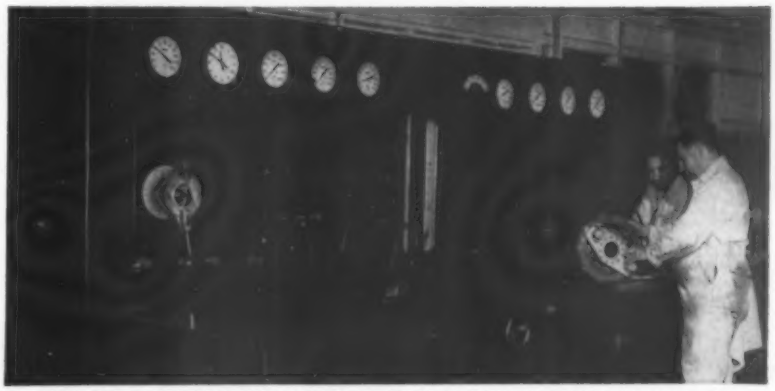
Leading manufacturers in Canada, United States and other countries throughout the world, choose Greer equipment for their precision testing operations. Airlines count on Greer to keep 'em flying. For accuracy, dependability, precision testing that minimizes the human element, Greer is the standard of the aviation world.

Today, Greer offers a complete line of *standard* test and maintenance equipment. This standardization has reached the point where Greer units can be ordered from a catalog (write on letterhead for your free copy).

Of course, there will always be out-of-ordinary test requirements. To fill them, Greer maintains a highly-specialized engineering staff ready to discuss *your* problem without obligation.

GREER PORTABLE HYDRAULIC TESTER provides hydraulic test fluid to 3400 psi and flows to 20 gpm for hydraulic system test on the flight line.

GREER
TEST EQUIPMENT



GREER STATIONARY HYDRAULIC ACCESSORIES TEST STAND is shown here in operation at the Avro plant in Malton, Ontario. This machine fully checks hydraulic system accessories including the system pump at flow rates to 20 gpm and pressures of 3400 psi. Greer also builds test equipment to *your* specifications.

Greer Hydraulics Inc. 454 Eighteenth St., Brooklyn 15, N. Y.

Field Offices: 407 S. Dearborn Street, Chicago • 298 Commercial Building, Dayton • 2832 E. Grand Blvd., Detroit and representatives in all principal cities • Also manufacturers of Accumulators and other hydraulic components.

MR. J. STUART ROTCHFORD of Happiness Tours and Journeys International, and a new leader in the field of Latin American travel.

in

south america

Braniff does make the difference!

Wondering about flying down to Rio or any glamorous Latin American city Braniff serves? Talk to J. Stuart Rotchford, genial general manager of Happiness Tours and Journeys International.

He's an expert at wrapping up a tour, lock, stock and barrel. And he's had our good number since that happy day his scouts flew to South America to case the place. They rushed back, paraphrased a famous American with "go South!"

Right then and there, Mr. Rotchford began packaging wonderful trips by Braniff for his clients (who call him again and again for travel advice). Well, they'll be delighted next time they ask where to go and how to get there. He's saying "South America" and

it's

BRANIFF

INTERNATIONAL AIRWAYS

LOVE FIELD • DALLAS, TEXAS

U. S. DOMESTIC AIRLINE TRAFFIC FOR JANUARY, 1953

AIRLINES	REVENUE PASSENGERS	REVENUE PASSENGER MILES	AVAILABLE SEAT MILES	PASSENGER LOAD FACTOR %	MAIL TON-MILES **	EXPRESS TON-MILES	FREIGHT TON-MILES	TOTAL TON-MILES REV. TRAFFIC	AVAILABLE TON-MILES FLOWN	% AVAILABLE TON-MILES USED	REVENUE PLANE-MILES	SCHEDULED MILES	% SCHEDULED MILES COMPLETED
American	375,689	219,620,000	312,667,000	70.24	1,429,261	965,355	4,025,019	28,071,144	41,924,666	66.96	7,152,004	7,460,927	94.36
Braniff *	104,142	34,924,000	64,525,000	54.12	160,380	120,786	242,090	3,861,952	7,684,315	50.26	1,859,052	1,942,524	95.24
Capital	145,667	48,784,000	86,522,000	56.38	170,498	245,199	290,536	5,362,249	11,961,386	44.83	2,072,551	2,097,309	92.17
Caribair	10,903	869,000	1,766,000	49.21	1,027	. . . .	1,549	72,500	173,729	41.73	66,271	61,850	100.00
C & S	39,428	15,641,000	25,693,000	60.86	65,958	80,259	113,570	1,760,321	3,141,730	46.03	759,452	821,802	91.44
Colonial	22,591	6,140,000	11,355,000	54.07	11,934	8,623	18,298	625,144	1,268,529	49.28	322,891	335,549	86.24
Continental	28,152	10,832,000	21,374,000	50.68	35,266	15,444	60,512	1,150,360	2,518,285	45.68	679,996	672,032	99.66
Delta	83,780	41,100,000	62,730,000	65.52	163,519	122,072	343,850	4,583,799	7,587,487	60.41	1,618,806	1,615,654	97.70
Eastern	363,404	205,936,000	342,197,000	60.18	469,862	432,325	637,487	22,993,119	45,855,857	50.14	6,146,145	6,151,498	95.84
Hawaiian	27,805	3,650,000	6,677,000	54.66	2,803	. . . .	102,666	407,086	847,378	48.04	309,923	241,254	99.13
National	72,820	54,056,000	82,279,000	65.70	123,956	54,932	530,314	6,230,400	10,488,692	59.40	1,719,472	1,721,841	94.89
Northeast	26,153	5,043,000	10,181,000	49.53	10,907	19,911	17,321	515,960	1,018,072	50.68	341,570	426,202	78.69
Northwest	60,306	42,867,000	81,230,000	52.77	250,323	128,099	247,643	4,842,533	9,236,863	52.43	1,427,949	1,494,020	91.66
Trans Pacific	12,702	1,627,000	3,814,000	42.66	848	75	6,224	132,574	225,956	58.67	136,272	123,246	98.50
TWA	193,272	165,460,000	239,107,000	69.20	844,829	824,012	1,499,425	19,009,838	30,282,424	62.78	4,773,807	5,119,796	91.62
United	257,098	173,297,000	273,186,000	63.44	1,726,723	1,156,529	2,143,915	21,626,702	42,061,555	51.42	6,192,892	6,626,790	92.39
Western	61,609	23,983,000	42,346,000	56.64	111,477	54,362	68,374	2,524,089	4,708,954	53.60	1,025,958	1,096,447	93.21
TOTALS	1,885,521	1,053,829,000	1,667,654,000	63.19	5,578,571	4,227,983	10,348,793	123,769,770	220,985,878	56.01	36,605,011	38,008,741	93.67

* Braniff's figures do not include local service segment (route 106) operated by Braniff as result of merger with NOA.
** Includes air parcel post.
NOTE: 1. Above figures include both scheduled and non-scheduled operations.

U. S. INTERNATIONAL AIRLINE TRAFFIC FOR JANUARY, 1953

AIRLINES	REVENUE PASSENGERS	REVENUE PASSENGER MILES	AVAILABLE SEAT MILES	PASSENGER LOAD FACTOR %	U. S. MAIL TON-MILES *	FOREIGN MAIL TON-MILES	EXPRESS TON-MILES	FREIGHT TON-MILES	TOTAL TON-MILES REV. TRAFFIC	AVAILABLE TON-MILES FLOWN	% AVAILABLE TON-MILES USED	REVENUE PLANE-MILES	SCHEDULED MILES	% SCHEDULED MILES COMPLETED
American	8,959	6,653,000	10,399,000	63.98	15,576	4,360	2,198	159,915	904,173	1,440,533	62.77	204,751	204,751	100.00
Braniff	2,871	6,627,000	15,775,000	42.01	44,951	10,887	. . . .	85,141	873,501	2,206,441	39.59	360,717	366,208	98.50
C & S	3,496	3,586,000	7,224,000	49.64	5,215	825	. . . .	89,933	468,783	1,001,545	46.81	154,940	156,201	97.88
Colonial	2,696	2,093,000	3,611,000	57.96	1,559	419	. . . .	3,246	232,556	433,389	53.66	69,872	50,076	93.22
Eastern	10,535	15,247,000	21,625,000	70.51	37,873	. . . .	. . . .	36,469	1,657,821	2,980,534	55.62	352,367	349,247	95.37
National	7,946	3,744,000	8,779,000	42.65	4,234	. . . .	3,397	21,498	413,253	1,081,225	38.22	145,627	147,355	98.83
Northwest	5,501	9,420,000	17,130,000	54.99	111,220	34,317	18,043	559,325	1,738,495	2,850,044	61.00	506,325	508,741	91.28
Panagra	9,910	11,098,000	20,191,000	54.97	31,394	28,054	. . . .	209,550	1,483,641	2,721,750	54.51	503,480	498,577	99.40
PAA														
Latin Amer.	70,668	63,685,000	101,252,000	62.90	263,304	78,403	. . . .	1,900,970	8,643,346	13,942,238	61.99	2,299,030	2,049,012	97.36
Atlantic	33,327	38,760,000	73,980,000	52.39	455,308	126,621	. . . .	953,211	5,766,043	10,334,214	55.79	1,339,949	1,489,804	87.51
Pacific	9,313	30,412,000	51,285,000	59.30	368,603	59,310	. . . .	472,432	4,193,097	8,010,824	52.34	968,953	953,320	100.00
Alaska	3,517	3,790,000	10,130,000	37.41	34,967	. . . .	. . . .	346,841	780,640	1,482,001	52.67	234,505	229,537	99.50
TWA	11,713	31,126,000	51,165,000	60.83	353,571	166,057	. . . .	613,789	4,446,806	6,856,927	64.85	1,194,221	1,208,040	97.29
United	3,354	8,317,000	13,020,000	63.88	52,216	. . . .	. . . .	38,011	983,903	1,855,653	53.02	252,514	262,956	95.26
TOTALS	183,806	234,958,000	405,566,000	57.83	1,779,991	509,253	23,638	5,490,331	32,585,058	57,197,318	56.97	8,587,251	8,473,825	95.70

* Includes air parcel post.
NOTE: 1. Figures include both scheduled and non-scheduled operations.
2. Data in above tabulations were compiled by American Aviation Publications from monthly reports filed by the airlines with the Civil Aeronautics Board. Figures for American Airlines include that carrier's service to Mexico but not to Canada; for Braniff to South America; C & S to South America; Colonial to Bermuda; Eastern to Puerto Rico; National to Havana; Northwest to Orient and Honolulu; and United to Honolulu. Operations of U.S. carriers into Canada are included in domestic reports to CAB, in accordance with CAB filing procedures.

U. S. LOCAL SERVICE AIRLINE TRAFFIC FOR JANUARY, 1953

AIRLINES	REVENUE PASSENGERS	REVENUE PASSENGER MILES	AVAILABLE SEAT MILES	PASSENGER LOAD FACTOR %	MAIL TON MILES	EXPRESS TON-MILES	FREIGHT TON-MILES	TOTAL TON-MILES REV. TRAFFIC	AVAILABLE TON-MILES FLOWN	% AVAILABLE TON-MILES USED	REVENUE PLANE-MILES	SCHEDULED MILES	% SCHEDULED MILES COMPLETED
Allegheny	10,915	1,558,000	5,102,000	30.53	5,049	10,302	. . .	163,920	583,090	28.11	242,954	270,346	85.92
Bonanza	5,028	1,239,000	3,300,000	37.55	2,309	2,620	2,314	125,737	366,927	34.27	132,000	133,164	98.74
Braniff*	3,056	569,000	1,546,000	36.80	1,350	1,866	3,068	60,486	161,359	37.49	67,233	83,711	80.32
Central	3,912	521,000	3,332,000	15.64	3,026	1,070	1,966	55,712	380,822	14.63	158,676	163,494	97.05
Frontier	10,081	2,743,000	8,129,000	33.74	8,290	5,210	26,745	302,223	774,068	39.04	388,238	389,930	97.41
Lake Central	1,854	296,000	1,322,000	22.39	874	4,008	664	33,031	153,536	21.51	64,107	78,492	78.55
Mohawk	8,042	1,336,000	3,226,000	41.41	1,907	5,788	4,319	135,304	375,998	35.99	153,653	176,663	84.50
Mid-Central	10,550	1,713,000	5,614,000	30.51	7,146	12,255	. . .	183,029	641,380	28.54	267,330	330,925	80.78
Ozark	5,793	989,000	5,105,000	19.38	2,919	4,836	. . .	100,471	503,336	19.96	204,193	242,048	83.67
Piedmont	15,833	3,566,000	8,929,000	39.94	6,778	8,934	11,897	369,729	1,020,146	36.24	425,061	468,144	89.96
Pioneer	14,765	4,092,000	10,672,000	38.34	10,616	3,515	13,489	413,961	1,037,516	40.38	296,433	309,594	95.44
Southern	8,428	1,456,000	5,195,000	28.03	5,743	6,054	. . .	153,763	564,898	27.22	247,398	255,388	96.50
Southwest	11,400	2,147,000	4,388,000	48.93	6,433	2,997	8,514	223,017	501,480	44.47	208,950	219,150	94.75
Trans-Texas	6,696	1,477,000	4,882,000	30.26	7,899	2,269	6,690	158,035	557,990	28.32	232,496	238,948	96.52
West Coast	8,549	1,562,000	5,760,000	27.12	3,045	1,701	3,087	151,039	512,838	29.45	274,211	296,174	92.24
Wiggins	166	17,000	139,000	12.23	75	163	. . .	1,764	14,869	11.86	35,823	48,066	72.53
TOTALS	125,068	25,281,000	76,641,000	32.99	73,464	73,588	82,753	2,636,221	8,150,253	32.34	3,398,761	3,704,287	90.70
						Helicopter Mail Service							
HAC	. . .	. . . .	. . . .	. . .	2,006	. . .	. . .	2,006	4,853	41.35	24,294	28,498	85.25
Los Angeles	. . .	. . . .	. . . .	. . .	3,255	. . .	. . .	3,255	9,983	32.61	23,416	30,292	77.30
Airways	. . .	. . . .	. . . .	. . .	1,273	. . .	. . .	1,287	5,438	23.67	13,595	18,732	72.58

* Figures cover operations of local service route 106 operated by Braniff Airways as result of Braniff-NOA merger, effective August 16, 1952.
NOTE: Above figures include both scheduled and non-scheduled operations.

the operator of the electronic system,

Supplementing Delta's Service between
CHICAGO – MIAMI ATLANTA – DALLAS

Delta's Millionaire Dream Vacations
Start April 15 in Miami and the Caribbean

NEW! Owl Convair Aircoach Every Night Across the South

Delta AIR LINES

General Offices: Atlanta, Georgia

'BRAIN' stores seat data.

New Reservations System for BEA

A SEMI-AUTOMATIC reservations system, through which agents can tell instantly whether seats are available on any flight for a month ahead, has been installed in London by British European Airways and will go into operation soon.

The only other system anything like the BEA "Flightmaster" is American Airlines' Reservisor, now operating in New York.

BEA estimates that the Flightmaster will speed up reservations by 50% and would enable the booking of 2,000,000 more passengers yearly without additional staff. Its ultimate capacity, BEA believes, is 6,000,000 passengers annually.

The system has a "brain" which is an electronic storage device for seats. This is a panel 20 feet long, by six feet, by six inches deep, looking somewhat like a big cribbage board, with 32,000 colored plugs and sockets.

An agent, through use of a handset connected to the "brain," can find out immediately whether space is available on a flight and, if not, what the alternatives are. The device stores seats for a month ahead on all BEA routes except the Channel Islands, which are shown for six months.

If space is available, the agent forwards a reservations card via moving belt to a control clerk. When that particular flight is filled, the clerk informs

the operator of the electronic system, who places a plug in a hole on the board, breaking a circuit. From then on, the agents' handsets indicate that no more seats are available on the flight.

It thus appears that the Flightmaster differs from American's Reservisor in that an agent using the latter system can, with a lever on his handset, erase from the electronic "brain" a seat he has sold. In the Flightmaster system flights are blocked out by the operator who breaks the circuit by manually inserting the plug.

At present there are 48 handsets, but provision has been made for twice that number. They are situated in two rows on each side of a newly-designed 15-channel endless belt conveyor. A handset is about the size and shape of a large typewriter and has keys which, when operated, cause lights to indicate whether space is available. At the top of the unit is a series of cards coded so that each BEA flight can be referred to by number. Below the cards are the lights which indicate space. Below them are the keys.

On the right of the handset is a smaller box which includes a telephone system to provide fast communication for unusual inquiries.

Here's the sequence of events when a reservation is being made:

• **When a passenger telephones BEA** the operator plugs into a cyclic distributor which automatically connects the caller with an agent at the conveyor belt table. On the agent's telephone set a light turns from red to green when he picks up the receiver, thus indicating that he is busy.

• **The agent** takes the passenger's request for a flight, and depresses the keys on the handset for coded flight number and date. After the lights tell him that space is available (if the flight is full, a red light flashes and alternate services are indicated) he records the reservation on a card and drops it into the appropriate slot in the conveyor.

• **The card travels** to a control clerk who makes up the flight sheet, and who informs the "brain" operator when the trip is full. The later then makes the appropriate adjustment on the board.

• **The card continues** down a belt if return space or some other further booking is required. It is picked up by a teleprinter operator, who requests the space on BEA or another airline. It then returns to the original agent, who informs the passenger.

The Flightmaster enables agent to book on all flights instead of being assigned to a particular route. BEA plans to extend the system to offices in Manchester, Glasgow and Birmingham. • • •

Airline Commentary

By Eric Bramley

THERE isn't much new under the sun. You think television's new, for example? We refer you to page 39 of the *Aircraft Yearbook for 1933*. You will see a picture of six people sitting in an airplane viewing a small circular screen in the front of the cabin. On the screen is the image of a woman. Caption under the picture states: "First transmission of a television image to an airplane was achieved in June, 1932, to this Western Air Express plane." Almost 21 years ago, mind you. Another "first" for Western (now Western Air Lines).

•

A couple of issues ago we commented that maybe the airlines should get together and standardize the name of low-fare service—either "tourist," "coach," "second-class," or something else. Here's one opinion, from Bob Johnson, vice president and assistant to the president of United Air Lines:

"You were certainly correct in your plea. . . . The other Sunday there was an article in one of the newspapers on tourist service to Hawaii, and the word 'coach' was used 11 times and the word 'tourist' six times. We have had a survey made of identification with the traveling public, and through this research we found that 'tourist' was the more effective term. Consequently, United is standardizing on 'tourist' and forming with the majority."

•

Colonial Airlines has adopted an interesting procedure for conserving its timetable supply, thereby saving money. The seat pockets on its airplanes don't contain timetables. Instead, there are cards asking: "Would you like a Colonial Airlines timetable?" Text explains that "your stewardess will be pleased to supply you with one or help you with your travel questions." Remainder of the card is used to call attention to the reconfirmation rule. The card gets you a timetable if you want it, and when it arrives the stewardess will be there too, to answer your questions.

•

Some of the year's topnotch promotional material has been coming from Canadian Pacific Airlines in preparation for inauguration of its Pacific jet Comet service. Copy and layout have been A-1. We don't know yet whether the campaign will be delayed by the fatal CPA Comet accident at Karachi during a delivery flight, but the material so far has been hard to beat.

•

There's a TV show we happen to see occasionally, called "Dangerous Assignment," starring **Brian Donlevy.** He's a U.S. secret agent who's always flying off to some remote place on a moment's notice. First part of the show (which is on film) is always the same—Brian gets his assignment from the "Chief"; next is a shot of the airplane in which he's flying; third is a shot of him sitting in the cabin.

What intrigues us is that wherever he goes, he's always on a TWA Constellation (in two recent episodes, he took TWA across the Pacific to the Philippines and to South America—new routes, no doubt). Then the shot in the cabin shows him sitting in a single seat next to a square window—looks like some plane that was flying 10-15 years ago. Anyway, as long as Brian insists on TWA, why doesn't someone (maybe TWA) arrange to have him filmed sitting in a double Connie seat next to a round window? Let's keep things reasonably accurate.

CAB Moves Against North American

CAB's enforcement office has instituted proceedings aimed at breaking up what it calls the "North American Combine." In a complaint docketed for Board action, the enforcement office asked revocation of letters of registration of four large irregular air carriers and cessation of air transport activities by four individuals and organizations operated by them.

These were named respondents in the complaint:

• **Twentieth Century Air Lines,** Trans National Airlines, Trans American Airways, and Jacob Freed Adelman doing business as Hemisphere Air Transport;

• **North American Aircoach System;**

• **Stanley D. Weiss,** James Fischgrund, Jack B. Lewin, and R. R. Hart, individually, and as partners in various companies affiliated with the airlines involved.

The group is generally considered the largest individual "combine" in the large irregular field and last year filed a merger-type proposal with the CAB.

The enforcement complaint charged that "the acts and conduct of the respondents . . . were deliberately planned and executed for the purpose of evading and circumventing the applicable provisions of the Act and the Board's regulations and concealing from the Board the true nature of the operations of all parties involved in this North American Combine."

The complaint cited numerous alleged violations and was one of the most extensive yet filed by the enforcement chief in a large irregular case.

Under CAB procedures, the filing of a complaint by the office of enforcement sets an investigation in motion. Respondents have 15 days to answer, the matter then goes before a Board examiner and finally to the full Board for decision.

American, UAL Route Changes Asked

Proposals for two new transcontinental route "segments" for United Air Lines and new Great Lakes-Gulf Coast routes for American Airlines highlighted a prehearing conference held last week in the third of CAB's newly activated route cases—the Southwest-Northeast Service Proceeding.

In all, eleven trunk-lines and one large irregular carrier had proposals to make, with only the northwest U.S. area excluded from possible consideration by CAB.

The lone large irregular applicant, Aero Finance Corporation of Miami, asked for a certificate to operate a passenger-coach operation between Tulsa and New York via Cincinnati.

The case started from a long-standing TWA application to add Tulsa and Oklahoma City to its transcontinental route. These were some of the trunkline proposals submitted to CAB Examiner William J. Madden at the prehearing conference:

• **United's attorney,** J. Stanley Stroud, urged consolidation of United's application for two "segments" between New York, Dallas, and Los Angeles. Howard Westwood, counsel for American, urged that new applications for Detroit-New Orleans and Houston be brought in.

• **Braniff's Hubert A. Schneider,** Delta's L. Welch Pogue and D. Franklin Kell, and C&S' Richard S. Maurer all submitted proposals for extending their systems east to the New York area and, in some cases, west to Los Angeles.

• **Capital's Robert A. Hankins** and National's Richard A. Fitzgerald promised a possible side feud for Norfolk-Washington-New York rights among other proposals each had for service to other areas. Even Northeast, in what is essentially a Tulsa-Oklahoma City proceeding, thought it might be necessary to have its New York-Washington and conceivably its New York-Miami applications consolidated.

As for TWA, the original applicant in the case, counsel James K. Crimmins, urged that the case be "as limited as possible."

CAB MISCELLANY

Failing to get reversal of a CAB revocation order against his line in the civil courts, **Amos E. Heacock,** head of **Air Transport Associates,** has asked **CAB for a 60-day stay** of its order to **permit an orderly winding up of business.**

Temporary mail rates for Braniff Airways' domestic routes have been fixed by the Civil Aeronautics Board at **53c per ton-mile.** This is considered the non-subsidy rate for so-called Group II carriers under CAB's administrative subsidy separation report.

CAB News

AS OF NOW . . .

CAB is up to its head in extensive cases, each of which promises to run from one to three years before final decision. Chief among the newcomers to this category are major route proceedings which envision a virtual realignment of the air line route structure.

The **New York-Chicago Case,** the **Denver Service Case,** and the recently activated **Southwest-Northeast Service Proceeding,** head the list. There have been initial prehearing conferences in each, but each must now await a CAB order defining the territorial scope to be considered. Then, a second prehearing conference in each case will apparently be necessary.

Airline attorneys figure it will be late summer or fall before any of these cases gets "even close" to hearings.

Following the same pattern also is the **Bonanza Air Lines Certificate Renewal Case.** Bonanza, Southwest, Western, Airline Transport Carriers and California Central Airlines all have new route proposals for service generally between Reno/Phoenix, on the one hand, and San Francisco/Oakland/Los Angeles, on the other, which they want consolidated if CAB is so inclined.

Cases now under way with longevity as the keynote are the **Large Irregular Air Carrier Investigation,** the **trans-Atlantic Mail Rate Case** and the **General Passenger Fare Investigation.**

RECENT CAB DECISIONS

• **West Coast Airlines** authorized to suspend service temporarily at Coeur d'Alene until 60 days after disposition of any certificate renewal proceeding involving the carrier.

• **Western Air Lines** authorized to suspend service temporarily between Rapid City and Sheridan, Wyoming, until March 31, 1955.

• **Consolidated Flower Shipments, Inc.**—Bay Area, relieved from terms of cease and desist order, otherwise effective March 7, pending reconsideration of cease and desist order.

• **Transocean Air Lines** denied exemption to engage in regular cargo operations between U. S. and Europe.

CAB CALENDAR

Apr. 2—Oral argument before the Board in Portland-Seattle Service Case. Washington, D. C. Docket 2901 et al.

Apr. 9—Oral argument before the Board in Trans-Texas Airways Segments 2 & 6 Renewal Case. Washington, D. C. Docket 5233.

Apr. 19—Hearing in Tariff Liability Rules Investigation. Washington, D. C. Docket 4059 et al.

Apr. 27—Hearing in National Airlines Final Mail Rate Case. Washington, D. C. Docket 3037 et al.

May 1—Hearing in General Passenger Fare Investigation. Washington, D. C. Docket 5509.

The STITCH IN TIME that helps a lot of customers

How a famous surgical manufacturer "sewed up" their own distribution

Davis & Geck, Inc. (a unit of American Cyanamid Company) is a leading manufacturer of surgical sutures and other surgical specialties. Recently they considered two possible solutions to the problem of improving deliveries to their 10,000 widely-scattered dealers and consumers. Should they start a regional warehouse operation or try distribution by air direct from their Brooklyn plant?

At the manufacturer's request, American Airlines prepared an analysis of the two courses of action. Distribution patterns were broken down. Fixed cost of warehousing and air delivery were compared. Result: Davis & Geck took a "stitch in time" and today are distributing by air freight. Not only do they anticipate substantial savings—but, even more important, their customers are already benefiting from the improved delivery service.

If you have a distribution problem, why not see how airfreight can help you sew up customers?

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International Report

Supersonic flight research in connection with the development of an advanced type of stripped-down fighter is to be carried out by France's SO 9000 Trident rocket plane (above), which has started its test program. So far the aircraft has flown with power provided only by its two wing-tip-mounted Turbomeca Marbore jet engines, but tests using rocket power will be started shortly. A second prototype of the Trident is scheduled to fly in the fall.

Plans for New Luftwaffe Finished

Plans for the new Western German Air Force have now been finalized, although they cannot be implemented until the "contractual agreements" have been ratified. The new Luftwaffe program recognizes the German skill in ground support flying by allocating over half of the air force's 1,326 planes to this type of operation.

Present plans call for the training of flying personnel in the United States and for the use of American equipment by the new German air arm. Personnel will total about 80,000 officers and men.

Breakdown of the new Luftwaffe will be as follows:

Wings	Type of Aircraft	Aircraft per Wing	Total Aircraft
10	Fighter-bomber/ ground attack	75	750
4	Day fighter	75	300
2	All-weather fighter	36	72
2	Reconnaissance	54	108
2	Transport	48	96
20			1,326

The Tupolev Tu-12, the latest combat aircraft of the Soviet Union's naval air service, is shown above. This jet-powered torpedo carrier is now in squadron service at bases in Russia's Far East. With a warload of 6,600 pounds, the Tu-12 grosses 51,600 pounds and has a top speed of about 550 mph at sea level. Operating radius is 750 miles with full warload. Early models of the Tu-12 were fitted with RD-45 turbojets, the Soviet copy of the Rolls-Royce Nene, but later models are said to be powered by an axial-flow engine rated at about 9,000 pounds static thrust.

INTERNATIONAL BRIEFS

Two sets of French companies operating mainly between **France and North Africa are to merge:** Air Atlas and Air Maroc will operate under the latter's name, whereas Air Algerie and Air Transport will be consolidated into a new company known as Compagnie Generale de Transports Aeriens, under the control of the CGT (French Line) and Fraissinet steamship companies. The new Air Maroc will be mainly controlled by the CGT company, Air France, and Moroccan interests.

• •

Germany will not start airline operations until the spring of 1954 at the earliest, as a result of a decision not to buy second-hand equipment. Instead, latest reports indicate, the company will begin its services with new **Convair 340 and Douglas DC-6B aircraft;** these probably will not be available until early 1955.

• •

Work is well advanced on Spain's **Convair-like CASA 207** twin-engine transport. One of the two prototypes is likely to fly this year. Static tests will be started shortly. Another Spanish firm, **Iberavia,** has designed a two-place helicopter to be powered by a Spanish 150-hp Tigre engine.

• •

Aquila Airways, British independent airline operating flying boats, has been acquired by **Britavia,** parent company of another independent, Silver City Airways. Aquila's fleet will be increased and its operations expanded as a probable result of the deal.

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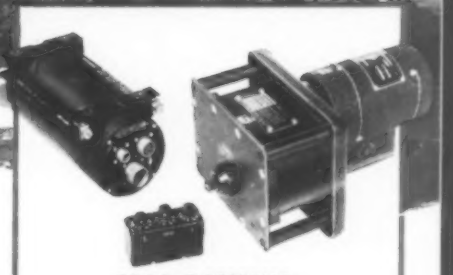

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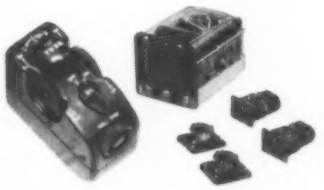

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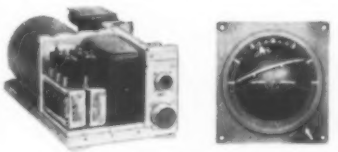

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People

MANUFACTURING

Delmond L. Getz, formerly director of engineering, has been elected vice president of the Steel Products Engineering Co.

Charles D. Arcularius is the new director of procurement of the Ford Instrument Co. Division of the Sperry Corporation. Formerly sub-contract manager, Arcularius was given overall direction of the recently combined subcontract and purchasing departments.

William Maxfield, former director of maintenance and engineering for Braniff Airways, has been named assistant to **L. B. Littrell**, vice president-aircraft and engines of Pacific Airmotive Corp.

Philip E. Spindel has been appointed chief engineer for Template Reproduction & Engineering Co. Spindel joins the Philadelphia firm from Piaseki Helicopter Corp., where he was design staff engineer.

C. A. Sereno has been named chief engineer of Air Associates, Inc., and **C. B. Terry** has been appointed general manager of the company's Electronic Division, in Orange, N. J.

Doyle Beasley has been promoted from general foreman of sheet metal preparation and foundry to assistant superintendent of all night operations for the Temco Aircraft Corp.

C. F. Herbold has been appointed to the newly created post of director of industrial relations at Jack and Heintz. Before joining Jack and Heintz, Herbold was director of manufacturing planning for Westinghouse in Ohio.

T. K. Greenlee, former chief engineer of Barber-Colman Co., has been appointed chief electro-mechanical engineer of Lear, Inc.

Cy Fenn has moved up from assistant chief to chief engineer-mechanical of the Edo Corporation. Fenn, who has been with Edo 18 years, will be in charge of all design and engineering work on non-electronic equipment produced by Edo.

AIRLINES

Gerald R. Thorton has been promoted from European director of sales to assistant to **Clyde S. Fullerton**, system general sales manager for Trans World Airlines.

W. L. Walker, until recently director of economic controls for Braniff Airways, has been elected treasurer of Alaska Airlines.

D. C. Tennant has been named director of operations for Trans-Canada Air Lines. In his former post as assistant director of engineering, Tennant also served as coordinator of the lines aircraft procurement.

Marlowe Brecht has been named factory representative for United Air Lines at Curtiss-Wright Corp.'s Electronics Division, Carlstadt, N. J., in connection with United's purchase of four new Dehmel flight simulators from Curtiss-Wright.

O. A. Byrne has joined Northwest Airlines in the newly created position of special sales counselor. Byrne was formerly assistant to the executive vice president and director of flight service for North Central Airlines.

W. Thomas Beebe, presently vice president-personnel of Chicago and Southern Air Lines, will be director of personnel after Delta Air Lines and C&S are merged.

The following employes have recently completed 20 years or more of service in the aviation industry.

- **Jim Campbell,** North American Aviation. General foreman, Los Angeles. 25 years.
- **Jack Eller,** North American Aviation. General foreman, Los Angeles. 25 years.
- **Dick Hunter,** North American Aviation. Chief of inspection, Los Angeles. 25 years.
- **Hans Ludwig,** North American Aviation. General superintendent, Los Angeles. 25 years.
- **Steve Janosko,** North American Aviation. Foreman, Los Angeles. 25 years.
- **Dick Seifried,** North American Aviation. Sheet metal worker, Los Angeles. 25 years.
- **Harry Hakman,** North American Aviation. Foreman, Los Angeles. 25 years.
- **Dick Thaiss,** North American Aviation. Foreman, Downey. 25 years.
- **R. A. Culpepper, Jr.,** American Airlines. Operations manager, Little Rock. 20 years.
- **Frank T. White,** Trans World Airlines. Lead inspector, Kansas City. 25 years.
- **Lois Aubrey Bowen,** Trans World Airlines. Staff assistant, Los Angeles. 20 years.
- **R. H. McCormick,** Trans World Airlines. Supervisor, reservations service, Kansas City. 20 years.
- **Elise E. Murphy,** Trans World Airlines. Senior secretary, Kansas City. 20 years.
- **Bernard J. Dowd,** Trans World Airlines. Foreman, Kansas City. 20 years.
- **James M. Wulpi,** Trans World Airlines. District sales manager, Binghamton. 20 years.
- **Glenn L. Hall,** Trans World Airlines. District sales manager, Amarillo. 20 years.
- **Denver L. Lanning,** Trans World Airlines. Foreman, Kansas City. 20 years.
- **John A. Michelson,** Trans World Airlines. Captain, New York. 20 years.

No matter how marginal the weather, planes land safely on fields equipped with TVOR. This new let-down facility keeps your airport operating through rain, low ceilings and restrictions to visibility—extends its usefulness by 40%. TVOR provides all the security of VOR—*at less than one-fourth the cost.*

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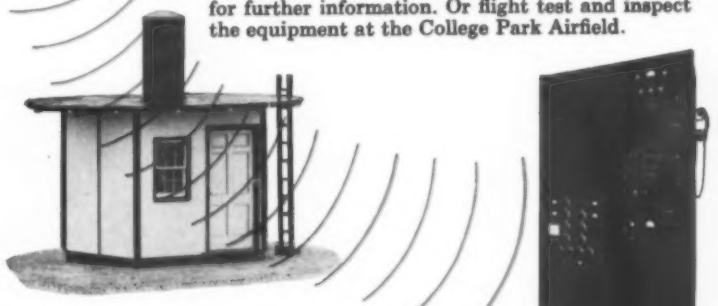

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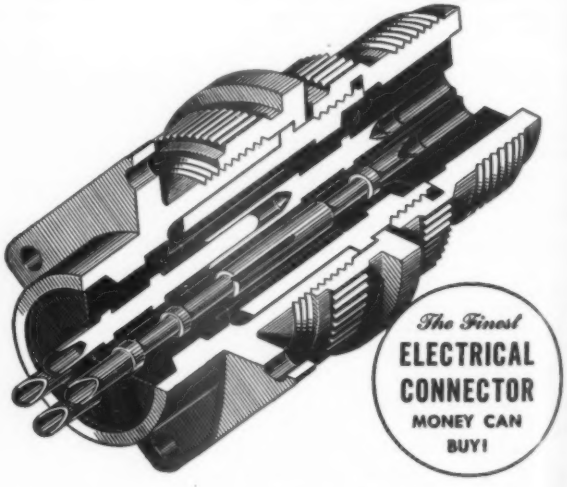

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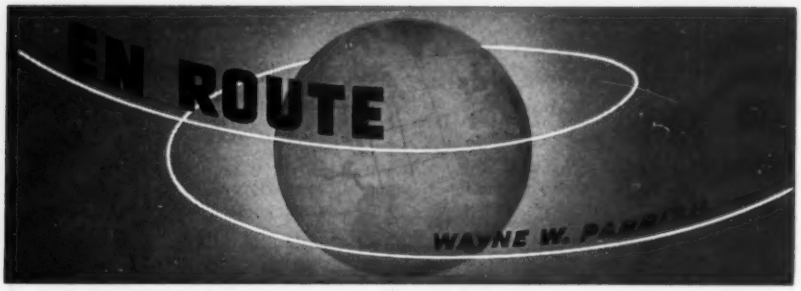

Polar Real Estate. I guess I'm in the Antarctic real estate business for sure. Having warned everybody who read this page in the February 16 issue that it was strictly a blue sky venture, I began receiving dollar bills asking for choice lots in this new as-yet-unnamed subdivision on **Hjalmar Riiser-Larsen's** vast territory leading out in some direction from the South Pole.

Thanks for the money, friends, but don't think it's been a total loss. You'll get the fanciest deed you've ever seen as soon as the artists and the printers can turn it out.

To top off the whole thing the leading humorist in the newspaper columning business, **Fred Othman,** did a column about my pet project which appeared in a great many papers throughout the length and breadth of the land. Othman claims he paid me $1.65 for 150,000 acres, but I haven't collected the money yet and if he thinks he's going to get 150,000 acres, he's a few hundred off. I'm playing no favorites. For $1.65 you get only 102,865 acres.

Puckish? Okey. Mr. Othman said "the distinguished and frequently puckish editor of AMERICAN AVIATION." Being the humorist he is, I took the word "distinguished" in stride, but I didn't know whether puckish referred to my appearance or my character until I looked it up in the dictionary. Webster's says puckish means mischievous. Can't base a libel or defamation of character suit on that. If he says I'm puckish, okey, so that's it.

Meantime I've got to find out just where the Commonwealth of Australia stands with regard to Riiser-Larsen's discovery. I'll let you know as time goes on. Frankly I've been a little too busy the past few weeks to trace down land titles in the south polar regions.

The first bird to respond to my welfare fund, with one buck enclosed, was good old **Tom Ashley,** managing editor of George Haddaway's *Flight* magazine down Dallas way.

Southern Exposure. "Prospects for Ice Caps in Arizona or Cuba are too much to take in these parts, so put me down for a chunk of that deal you're making on the South Pole," he wrote. "I'm enclosing the dough—I'd buy two pieces but I don't want to hog it up. As for location, my only request is that I'd really prefer a Southern exposure, if it please you-all."

Brother Ashley has a very splendid southern exposure. I mean his new building lot has. First come first served.

Then along came **W. R. Davies,** who manages the specialties section of Westinghouse Electric Corp. at Cleveland, who sent a welcome buck and was kind enough to say he wasn't asking any embarrassing details about the exact location or size of his lot. But he wanted a clarification of the zoning laws. That will be coming up, sir.

Then he said he wanted to establish a retail Westinghouse refrigerator outlet in order to prove that ice boxes can be sold to Eskimos or whatever equivalent to Eskimos there may be at the South Pole.

Well, Brother Davies, you've got the exclusive refrigerator concession. Very frankly, however, I think a plain old ordinary ice box might do just as well. As for Eskimos, there aren't any—only trillions of penguins. But maybe they need refrigerators, who knows?

Those Rich Oil Guys. From out Chicago way **Ralph Hall,** that immaculately dressed and well-mannered gentleman who adds much to the prestige of The Texas Company (he's assistant manager of aviation sales), joined up with a buck.

"I am beginning the preparation of plans for a modest little home into which I can move upon my retirement from The Texas Company," he wrote. "Will my deed convey grazing rights, and would you object to my having a small garden? Fresh vegetables, you know, fine for retired folks."

Okey, Ralph you've got grazing rights and you can certainly try to grow all the vegetables you want. But seems to me The Texas Company could do a little better for its retired hired hands than a dollar building lot near the South Pole. Are things that bad? But we-all poor folks will welcome you rich oil company fellas as neighbors, sure 'nuf.

THIS IS THE KIND of photo we like. Strictly unposed, it shows Roy Hurley, president of Curtiss-Wright Corp., with our favorite magazine (of which he's an avid reader) en route to Chicago in his company C-46. It was snapped by George W. Brady, director of engineering for the C-W Propeller Division.

Squier Needs Ice. Naturally I'd hear from **Carl Squier,** the venerable v.p.-sales of Lockheed. Enclosed a buck, too. Says he:

"Your real estate development in the area of the 45th and 50th longitudes east got me to thinking.

"I never have enough ice for cocktails. Your South Pole property seems to be the answer to this very perplexing problem.

"So herewith is my $1.00 for one of your choice corner lots in the Antarctic. I'd prefer an area on or near the coastline, for I enjoy views. It is hoped that the idea of taxation is forgotten and that a pamphlet will be compiled and distributed to all property owners on winterization procedures. Cooking with alcohol would be quite a switch!

"And please think twice—don't send the deed on ice. An igloo to you."

World's Biggest Airport. Another cash buyer is **Uel Stephens, Jr.,** of Texas Aviation Engineering Co. of Meacham Field, Fort Worth, who wants a corner lot and then says, "I also hereby apply for a franchise for a fixed base operation at the airport which you will, of course, establish. I intend to run my operation on the opposite side of the field and as far as possible away from the airline terminal, in line with my conviction that God never intended for man to fly in anything larger than a Bonanza."

Okey, Uel, you've got the fixed base concession and the airline traffic won't bother you. The airport is going to be an airport to end all airports. About 100 square miles have been set aside for the field, with 100,000-foot runways and three miles of solid ice packed down on the runways.

All the above comprises part of the response for building lots. Will keep you advised of progress.

Postscript. Some time ago I wrote about how the gals advertised their wares on bulletin boards in London. Two loyal readers of this page, **Peter Wood** of BOAC in Hong Kong, and **Peter Pratt** of TWA in London, have sent me a clipping from a popular Sunday London newspaper describing in lurid terms the gruesome murder of a gal picked up in Shepherd Market the locale about which I wrote. The moral is, I suppose, watch your step!

Also I see that Parliament is disturbed that these ads lower the dignity of London during Coronation time but a member of the House of Commons reported that there's nothing obscene about the gals pinning up ads and so nothing can be done about it. That's all, brother.

In Charleston W. Va. too, air travelers can step

360 VHF CHANNELS

WITH 50 WATTS OUTPUT!

WITH 50KC CHANNEL SPACING!

COLLINS 17M-1 VHF
Airborne Transmitter

COLLINS 51X
Airborne Communications Receiver

COLLINS new VHF transmitter and receiver now offer the airlines and executive aircraft owners a new concept in reliable radio communications.

With the 17M-1 360 Channel VHF transmitter, Collins standard fingertip control puts the 50 watt signal on any authorized VHF channel without delay or manual tuning. Excellent frequency stability, high output and high-level modulation put the signal into the busiest terminals.

The 51X 360 channel VHF receiver is the companion to the 17M-1. 50 kc channel spacing provides complete VHF coverage for all present and future needs. Same famous Collins fingertip remote control circuitry as used for Collins 51R receiver and adopted as standard by the airborne equipment industry. The 51X has the sensitivity, selectivity and spurious response rejection characteristics required for flight and airport traffic control.

Collins recommends the 37R-1 omni-directional VHF communications antenna as a companion unit for the 17M-1 transmitter and 51X receiver. Occupies no space inside cabin and is easy to mount on pressurized aircraft — stays firmly mounted under all conditions, including severe icing. Better radiation pattern for reception or transmission.

Write today for descriptive literature on the 17M-1 VHF Transmitter, the 51X VHF Receiver and the 37R-1 VHF Antenna.

For the best in aviation radio, it's . . .

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COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd St., NEW YORK 36 | 1930 Hi-Line Drive, DALLAS 2 | 2700 W. Olive Ave., BURBANK

News at Deadline

In Charleston, W. Va., too, air travelers can step from the plane into a car from Hertz

here, as at most airports, HERTZ is ready to give your passengers the finest car rental service!

Yes, the Hertz station at Kanawha County Airport, Charleston, West Virginia, is just one example of the excellent facilities and superior service offered by Hertz stations everywhere. For your passengers, who expect the best, only Hertz offers them *all* the advantages of car rental service.

Here are the reasons why HERTZ SERVICE is better for the air lines:

- Hertz, and only Hertz, can and does deliver cars to airports in more than 500 cities. Hertz maintains stations right at or adjacent to the airport in most key cities.
- Hertz with 29 years' car rental experience is dependable. It is the world's largest and only international car rental service—uniformly conducted in more than 500 cities throughout the United States, Canada, Alaska, Hawaii, Cuba, Great Britain, Mexico and Switzerland.
- The Hertz national advertising program consisting of full page advertisements throughout the year in Life, Saturday Evening Post, Collier's, Holiday, National Geographic, Time, Newsweek, and U. S. News & World Report, promotes the Plane-Auto Travel Plan, creates new air travelers, puts new business on your planes and builds Hertz popularity.
- Your passengers, reserving cars from Hertz before they take off, can be sure of fine, new cars that are clean and properly conditioned. All gasoline and oil, Public Liability, Property Damage, Fire and Theft Insurance and $100.00 deductible collision protection are included in the low rate—at no extra cost.
- Your passengers can rent from Hertz day or night for any length of time and enjoy quick, courteous, efficient service. Hertz National Courtesy Cards and International Charge Cards are carried by more than a million and a half men and women and are honored at all Hertz stations.

IMPORTANT!

Encourage your ticket sellers and information clerks to always recommend Hertz Service to your customers. It's the world's finest car rental service . . . and promotion of Hertz Service will pay off in more customer good will and extra business for you. Also, promote this popular service in your national and local advertising, direct mail and counter literature, and other advertising programs.

- Air Travel Cards—are honored at all Hertz stations. They serve as identification, eliminate deposit requirements and provide credit privileges if desired.

For complete information write:

HERTZ *Rent-A-Car* **SYSTEM** Dept. C33, 218 S. Wabash Ave., Chicago 4, Ill., Phone: WEbster 9-5165

News at Deadline

Military Production Base Doubled

Military aircraft production during the last quarter of 1952 provided the Air Force with more planes than have been lost in Korea since the beginning of the war, according to former Defense Secretary Robert A. Lovett. The last half of the year saw the number of USAF wings rise from 48 to 100.

The figures were contained in the Semi-Annual Report of the Secretary of Defense and the other service secretaries. Personnel in the Air Force more than doubled during the 30 months following the outbreak of war in Korea, reaching a total of 957,000. The industrial base of USAF production has also doubled, according to ex-Air Secretary Thomas K. Finletter.

Ryan Cautious on Route Expansion

The outlook is bright for the domestic airline industry, in the opinion of Oswald Ryan, chairman of the CAB, but the Board intends to tread cautiously in considering route expansions, since the present situation may not last.

Competition, Ryan told the House Interstate and Foreign Commerce Committee, is desirable only insofar as it bolsters the economic position of the industry as a whole. Though the Board has a mandate to foster it, competition is merely a means to an end, not an end in itself. The Board must consequently take care that the industry does not overreach itself during this period of abnormal prosperity, striving instead for a sound route pattern.

Other main goals are: a self-supporting basis for the industry; lower fares and extended service to smaller communities; improved safety.

Tigers, Slick to Merge

A merger between the Flying Tiger Line and Slick Airways is expected in the near future. General agreement on a merger plan has reportedly been reached already, with unofficial approval of the boards of directors already secured. Official confirmation of the report has not yet come from either of the companies.

Pioneer Still Flying; Arranges Bank Loan

Pioneer Air Lines was still operating over all segments of its routes at press-time (March 24) although the CAB had turned down its request for emergency mail pay relief. Interim financial arrangements that will keep PAL in operation pending conversion to DC-3's have been approved by the Chase National Bank of New York. Also involved in the deal is the First National Bank of Dallas. These were developments which followed a closed door meeting in Washington on March 20 between Pioneer officials and CAB members and staff.

At the CAB meeting Pioneer President Robert J. Smith indicated Pioneer would revert to DC-3 operations as soon as the Martin 2-0-2 fleet, which CAB had refused to underwrite with higher mail pay, can be disposed of. Smith figured that the replacement will take three months.

Jet Engine Strike Continues at GE

A strike of 5,600 CIO-Autoworkers and AFL-Machinists at General Electric's J47 plant at Evendale, Ohio, continued as this issue went to press, with no prospect of quick settlement in sight.

A meeting of company and union representatives with the Federal Mediation and Conciliation Service in Cincinnati was not expected to produce a settlement for several reasons: strained relations between the company and the unions on several counts; friction in the past between G. E. and the Federal Mediation and Conciliation Service; and the company's firm stand against the granting of a union shop.

Dutch Overhaul C-47's

A million-dollar contract for the overhaul of Air Force Douglas C-47's has been granted to the Dutch firm of Avio Diepen. The work, which will take from 12 to 15 months, involves the modernization of planes which have been in storage.

First Flight of XF2Y-1 Expected

First flight for Convair's hydro-ski XF2Y-1 is expected momentarily. The water-based jet fighter has finished taxi tests, and the installation of an ejection seat and activation of the retraction system for the hydro-skis should be completed by the end of this month. The test pilot who will fly the XF2Y-1, Sam Shannon, has been checking out other aircraft equipped with the novel landing gear at the Navy test center at Patuxent, Md.

Braniff to Try Out Navy's Airborne Radar

Airborne radar will be put into routine operation by a scheduled domestic airline for the first time when Braniff Airways begins using two sets loaned by the Navy. The two APS-42 units were built by the Radio Corporation of America, operate on 3.2 centimeters wave-length, and are valued at between $12,500 and $15,000 each.

Certain difficulties are inherent in Braniff's use of the equipment, since it is still classified by the Navy and therefore subject to security restrictions. Such rules require an armed guard whenever the airplane is left unoccupied and require that everyone who enters the airplane be cleared. Further complications may arise from the fact that Braniff wants to try out the equipment in South America.

Reverse Thrust Device

A device for producing reverse thrust on jet engines, equaling as much as 55% of the static thrust, has been developed in Switzerland by the Zurich Polytechnicum.

The device makes use of curved rings set into the periphery of the tailpipe. The exhaust gases ordinarily pass through the tailpipe without hindrance. By the use of movable vanes the gases can be directed against the rings, by which they are deflected out of the tailpipe and forward in the direction of flight. The exhaust gases exert a backward thrust against the rings, which, transmitted through the engine mounting, slows the aircraft.

S&W President Sees Turboprop Freighters

Turboprop air freighters are seen as an early development by Raymond A. Norden, president of Seaboard & Western Airlines, but he believes that

turbojets will not be used on trans-Atlantic freight routes for at least 10 years.

Fuel requirements of turbojets rule them out, in Norden's opinion. The Lockheed Super Constellations which S&W has on order are so designed that turboprop engines can be installed when they become available.

Vickers' 525 New Royal Navy Fighter

In "super-priority" production for Britain's Royal Navy, according to foreign sources, is the Vickers-Supermarine 525, a heretofore unidentified twin-jet, swept-wing fighter. The aircraft is an advanced version of the same company's 508.

USAF Weighs C-46 Cargo Pool Plan

An Air Force pool of C-46's for cargo operations is under consideration. Under the proposed plan, bids would be made by commercial operators for each cargo flight that came up; low bidder would be supplied with a C-46 for that flight only, after which the aircraft would be returned to the USAF pool.

Originator of the idea was Oliver Brumm, civilian with the AF at Wright-Patterson AFB. At least 28 of the aircraft would be available for the plan.

Glenn Martin Reports $5.8 Million Profit

The Glenn L. Martin Co. is back on the profit side of the ledger with a $5,808,312 profit for the year ended December 31, 1952, the company's annual report discloses. The profit was equal to $3.03 a share on 1,913,974 outstanding shares, and it compares with a loss of $22,178,434 during the previous year.

Sales and other income in 1952 amounted to $146,385,408, including $1,786,011 profit on the sale of leased aircraft. Backlog at year end was about $650,000,000, compared with $402,000,000 a year earlier.

Martin also managed a substantial reduction of its debt during 1952. Debt at the end of 1952 was approximately $27,000,000, a reduction of more than $26,000,000 from the end of the previous year. This made it possible to arrange (in January, 1953) new V-loan credit to the extent of $32,500,000, $17,000,000 of which is now being used. All loans and commitments with the Reconstruction Finance Corp. were either retired or canceled.

Higher Net Profit Reported by Temco

Temco Aircraft Corp. and its subsidiary, Luscombe Airplane Corp., reported a consolidated net profit of $1,859,602, or $1.73 a share on 1,074,912 outstanding capital shares, for the year ended December 31, 1952. This compares with consolidated profits of $1,131,854, or $1.05 a share, in 1951.

Sales for 1952 totaled $55,109,481, compared with $37,278,187 in the previous year. Backlog of the two companies was about $276,000,000 at the end of 1952, up from $124,000,000 at the end of 1951. Temco's earnings alone amounted to $1,349,299 after taxes, up from $826,053 in 1951.

To Study Jet Streams

A study of jet streams during routine Pacific operations eastbound from Tokyo will be undertaken by Pan American World Airways under a contract granted by the U. S. Navy Bureau of Aeronautics. The project is expected to last 27 months. Accurate forecasting of jet stream locations would permit more efficient operations for both civil and military aircraft.

Grumman Cougar to Be Sent to Korea

Next combat aircraft to be sent to Korea by the Navy will probably be the Grumman F9F-6, the swept-wing Cougar, according to Vice Adm. Ralph A. Ofstie, new deputy chief of naval operations for air. The Navy version of the Sabre, the North American Aviation FJ-2 Fury, may also be sent to the Far East for combat "evaluation."

The F9F-6, with 7200 pounds thrust from its Pratt & Whitney J48-P8 engine, will have "substantially the same" performance as the F-86 and the Mig-15.

CAOA Name Change

Possible name change of Corporation Aircraft Owners' Association to National Association of Business Aircraft will be considered by the CAOA's board of directors at a meeting later this year.

Japan Plans Comet Service in 1955

North Pacific service with Comet II's is planned for 1955 by Japan Airlines Corporation, the projected Japanese flag carrier. The Tokyo-to-Seattle route would be flown twice weekly. Once-a-week Comet service would also be inaugurated to London via India at that time.

Propose Four Changes In Aeronautics Act

The Civil Aeronautics Board has submitted to Congress four points which it believes would be desirable amendments to the Civil Aeronautics Act. The proposals would:

- **Extend civil penalties** to economic violations; at present they are restricted to safety violations;
- **Authorize simpler procedures** for permitting certain foreign carrier operations in this country;
- **Eliminate present requirements** for Board approval of many trivial contracts;
- **Provide that a Board member** would continue to hold office until his successor is appointed and qualified.

Propose Extension for Air Taxi Certificates

Industry comment is being sought by the CAB on a proposal that expiration dates for Air Taxi Operator certificates be extended to February 20, 1955. The certificates expire one year from date of issuance under present regulations. Comments are requested before the deadline of April 20.

Boeing Beats Schedule On Jet Tanker Project

Work on Boeing's jet transport-tanker model, termed "Project X," is running one month ahead of schedule, and the first flight will be made on or before the deadline of mid-1954, according to Wellwood Beall, senior vice president.

The prototype will be a flying mock-up, designed to demonstrate the plane's performance in either of the two configurations. Production models, if they are forthcoming, will be designed and built for one or the other of the particular functions. No price has been set as yet.

The future of automatic flight is being shaped here

In discharging its responsibilities as the world's largest producer of aviation instruments and accessories, Eclipse-Pioneer must be constantly developing and testing for the future, as well as maintaining the highest possible quality performance in today's products. To accomplish this complex two-fold job requires far more than just ordinary methods and facilities. One of many of Eclipse-Pioneer's unique facilities is a high-precision analog computer installation used for testing and advancing world-famous E-P automatic flight systems. Capable of solving problems involving 28th order differential equations having as many as twenty continuously varying coefficients, this electronic brain's answers to simulated flight conditions and related problems are important not only in attaining highest performance in present systems, but also in hastening the tomorrow when more complete, more efficient flight systems will make the automatic airplane completely practical. Here is genuine evidence and a typical example of the way Eclipse-Pioneer is working to produce constantly better and better precision products for the world of flight.

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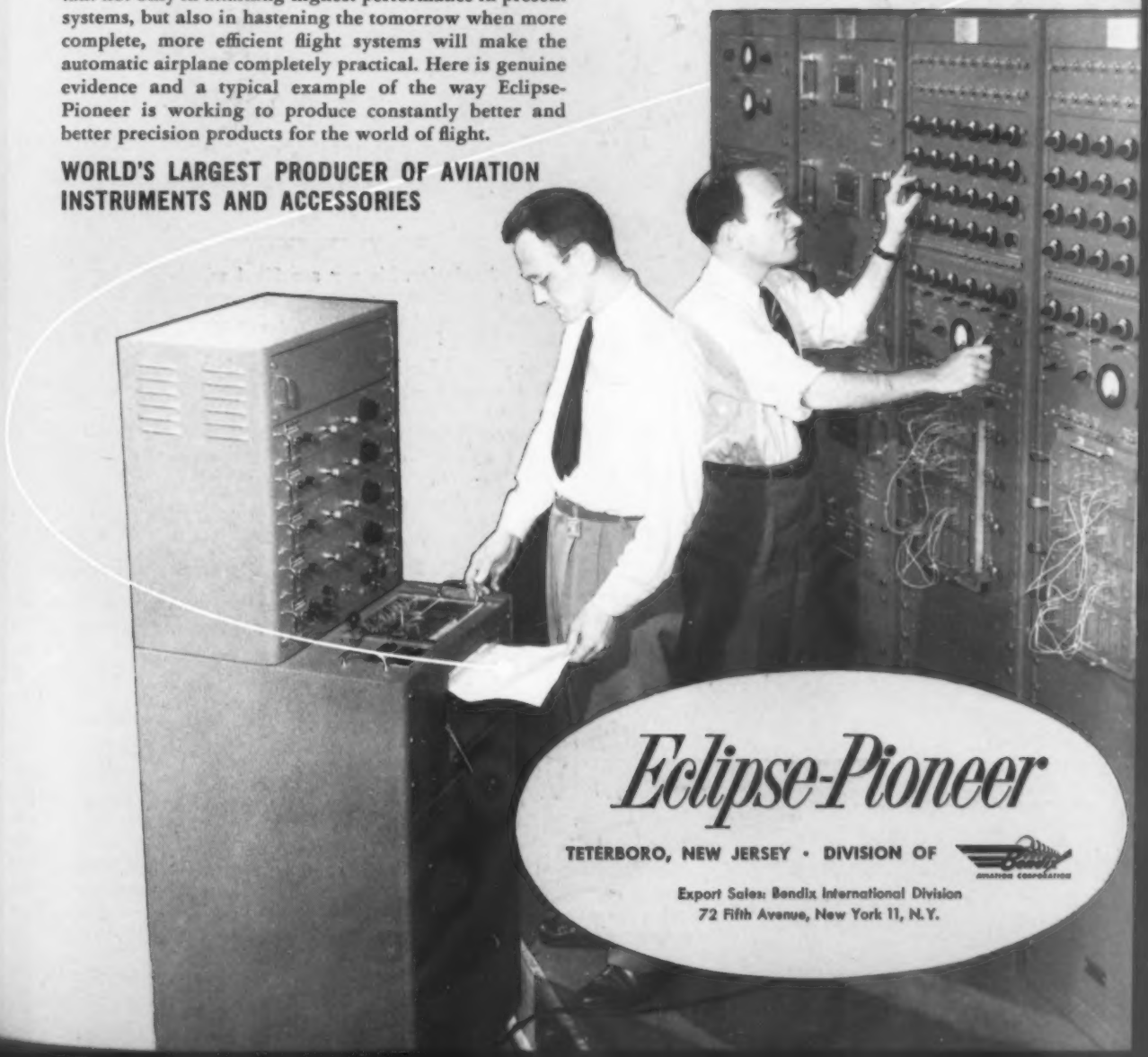
**Manufacturing capacity is now available for a great many models of these products.*

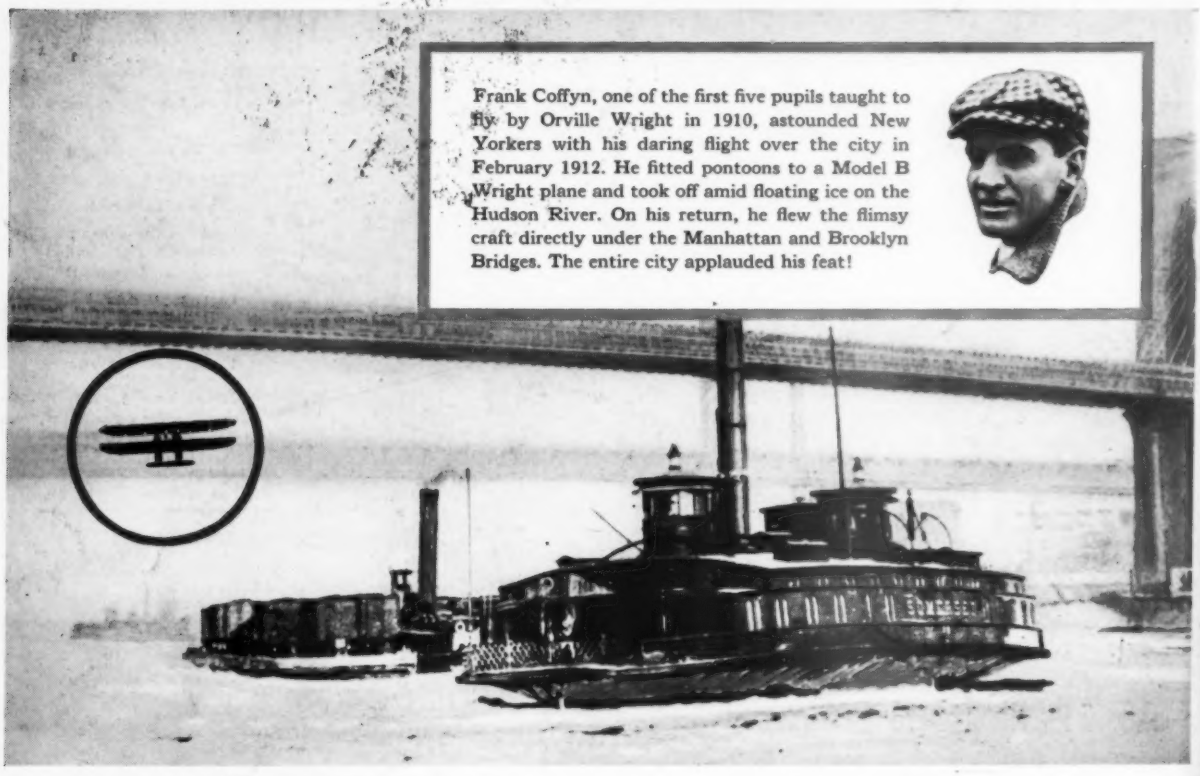


Eclipse-Pioneer

TETERBORO, NEW JERSEY · DIVISION OF Bendix AVIATION CORPORATION

Export Sales: Bendix International Division
72 Fifth Avenue, New York 11, N.Y.

Frank Coffyn thrills New York—1912



Frank Coffyn, one of the first five pupils taught to fly by Orville Wright in 1910, astounded New Yorkers with his daring flight over the city in February 1912. He fitted pontoons to a Model B Wright plane and took off amid floating ice on the Hudson River. On his return, he flew the flimsy craft directly under the Manhattan and Brooklyn Bridges. The entire city applauded his feat!

FORTY YEARS LATER. Today Frank Coffyn still takes an active interest in aviation. A member of Hiller Helicopters' staff, he is shown here (left) seated with Stanley Hiller, Jr. in one of the firm's "360" helicopters.

The pages of aviation history are filled with remarkable exploits of adventure and research, experiments which helped pave the way for aviation's pre-eminent position in the world today!

Another phase of aviation research—that pertaining to fuels and lubricants—has also contributed much to aviation's growth! Phillips Petroleum Company has played an important part in this development. Today, Phillips is one of the country's largest suppliers of aviation fuels for commercial and military use. In addition to a tremendous capacity for supplying 115/145 grade aviation gasoline, Phillips is always ready with the very latest fuels for turbo-props and jets.

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